TEACHERS COLLEGE RECORD

COMMUNICATION AND COMMUNICATION ARTS

PROGRESS REPORT 59

ANTHROPOLOGY AND COMMUNICATION
Solon T. Kimball 64

HOW THE PSYCHOLOGIST VIEWS COMMUNICATION
Irving Lorge 72

A PHILOSOPHIC VIEW OF COMMUNICATION
Philip H. Phenix 80

COMMUNICATION OF SCIENTIFIC THOUGHT
Howard F. Fehr 86

STUDYING EFFECTS OF MASS COMMUNICATION
Joseph T. Klapper 95

A HISTORICAL APPROACH TO THE MEDIA
Marshall McLuhan 104

COMMUNICATION ARTS IN THE CURRICULUM
Francis Shoemaker 111

HELPING STUDENTS OBSERVE PROCESSES OF COMMUNICATION Louis Forsdale 120

TEST CASE Lennox Grey 129

NEXT STEPS • BIBLIOGRAPHY 139 • 140

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TEACHERS COLLEGE RECORD

Progress Report

THIS prefatory report summarizes the policy and progress of the Teachers College interdivisional program since 1943, and some of the key questions facing the basic interdivisional course and the research seminar. Members of the Interdivisional Steering Committee are Professors Arthur Young, chairman, Irving Lorge, chairman of the research seminar, Max Brunstetter, Louis Forsdale, Lennox Grey, Francis Shoemaker, Ruth Strang, and Paul Witt.

The present Communication and Communication Arts issue of TEACHERS COLLEGE RECORD has been brought together by Francis Shoemaker as guest editor.

TWELVE years ago, midway in World War II, Teachers College offered its first comprehensive course in Communication and the Communication Arts, one of the first if not the first in an American university.

Since that time, concern with communication has become one of the most noteworthy developments in American education, as in American life generally. This has happened not chiefly because of Teachers College, obviously—though we have contributed significantly through the work of Lyman Bryson, Irving Lorge, and others—but because workers in many fields have seen and been stimulated by the same circumstances as had the members of our all-college committee when they recommended the new course: the impact and potentialities of vastly increased media and arts of communication; the increasing insight into human symbolic processes on the part of anthropologists, political scientists, psychologists, linguists, students of literature, the arts, philosophy, education, and many others; and other equally compelling educational forces to be noted later.

Educationally these dozen years have seen a sharpening of focal points and a breadth of application quite beyond the reaches of this foreword or the nine articles and bibliography which make up this Communication Issue of TEACHERS COLLEGE RECORD. A few will merely suggest the range and depth of the developments with direct educational import.

—Since 1945, nearly a fifth of the college freshman English courses in the country have become courses in communication—not

always realizing the promise of their name but showing the will and tendency to broaden the old rhetoric and composition courses.[1]

—Similarly, with reference to elementary and high school as well as college English, the Commission on the English Curriculum of the National Council of Teachers of English, in the three volumes prepared to date, has put major stress on a broad concept of communication alongside a sustained growth and development theme.[2]

—Leading university libraries are more and more conceiving of themselves as communication centers.[3]

—Major schools of journalism more and more think of themselves as schools of mass communication.[4]

—Many universities have become important centers or cooperating agencies for communication research—none more interesting than the memorable studies by the Commission on Freedom of the Press (concerned with all mass media, not print alone) subsidized by *Time-Life-Fortune*.[5]

—While the conception of the Communication Arts as a kind of contemporary applied humanities has been slower to take root, it now seems to be finding its place in programs, workshops, and research projects as varied as those in the University of Toronto,[6] Boston University, Brandeis University, and the Catholic University of America.

As anticipated, more than a little amorphousness has marked the first stage of development. Some observers may deplore the fact that communication seems to be anybody's field. But from the start, our Interdivisional Committee on Communication and the Communication Arts has urged flexibility of approach and structure. Hence, our purposeful avoidance of a highly centralized office or division or department of communication, and the provision that a candidate may major in any one of a large number of departments while giving a "communication emphasis" to his work. We have wanted interest, participation, and leadership to manifest themselves where they may, not be channeled prematurely.

At the same time, we have seen from the start that the growth of strong educational programs must go through at least three overlapping stages or phases: (1) a general, flexible, broadly exploratory phase; (2) a subsequent or simultaneous trying out of educational possibilities in one or more departments, to discover those most telling and pertinent applications which education must always seek (since "we can't teach everything"); and (3) a comparable trying out

[1] Earl James McGrath (ed.), *Communication in General Education* (Contributors: Lennox Grey, John C. Gerber, C. W. Edney, Harold B. Allen, Frederic Reeve, Thomas F. Dunn, S. I. Hayakawa, Lee S. Hultzén, Charles W. Roberts, James Paul Stokes, George S. Wykoff, I. Hooper Wise, John B. Hoben, Wesley H. Tilley, Norman Foerster, Wendell Johnson, Porter Perrin, Francis Shoemaker) (Dubuque, Wm. C. Brown Company, 1949).

[2] Vol. I, *The English Language Arts* (1952); Vol. II, *The Language Arts for Today's Children* (1954); Vol. III, *The English Language Arts in the Secondary School* (In press). (New York, Appleton-Century-Crofts).

[3] Frances Henne, Alice Brooks, and Ruth Ersted (eds.). *Youth, Communication and Libraries* (Chicago: American Library Association, 1949).

[4] See current bulletins of the University of Illinois, The University of Minnesota, The University of North Carolina, The University of Wisconsin and The University of Southern California.

[5] The Commission on Freedom of the Press, *A Free and Responsible Press* (Chicago, University of Chicago Press, 1947). Also: William Ernest Hocking, *Freedom of the Press: A Framework of Principle* (1946). Zechariah Chafee, Jr., *Government and Mass Communications* (1947). Ruth A. Inglis, *Freedom of the Movies* (1947). Llewellyn White and Robert D. Leigh, *Peoples Speaking to Peoples* (1946). Llewellyn White, *The American Radio* (1947). F. L. Hughes, *Prejudice and the Press*, 1950.

[6] E. S. Carpenter (ed.), *Explorations; Studies in Culture and Communication*. (Toronto: University of Toronto. Published three times a year for two years, 1954 and 1955). The publication was made possible by a grant from the Behavioral Sciences Program of the Ford Foundation.

and establishing of the most telling points of instruction and research in the field as a whole, systematically examining and extending the findings of phase 2, which will ultimately determine the principal constituents and structure of the field as a whole.

In the nine articles and bibliography comprising this Communication Issue of TEACHERS COLLEGE RECORD there are many signs that we can now move from phases 1 and 2 (which have proceeded simultaneously, and should continue, as will appear later) to phase 3, if we will. There is no inevitability or predeterminism about it, as we see it. It will take on the shape that men of perception and imagination give it—working practically with such resources of idea and experience as are gathered here from seven departments, and the test case of one department working in close association with these departments and others.

These nine articles and the bibliography continue to provide the exciting vista of the first exploratory phase. We shall continue to need that comprehensive outlook as new generations of teachers and students come along, and not least of all as we become increasingly engrossed in details and specialties in the field—recalling the old adage of the forest and the trees. These articles present evidence of maturing and a sharpened focus beyond the earlier exciting symposia on communication found in the bibliography: in the pioneer library-science-education-minded *Print, Radio and Film in a Democracy* (1942), edited by Douglas Waples of the University of Chicago, with contributions by H. L. Elsten, Ernst Kris, Bernard Berelson, Paul Lazarsfeld, Donald Slesinger, Harold D. Lasswell, H. F. Gosnell, Ralph W. Tyler, R. A. Beals; in the arts-and-education-minded *The Communication of Ideas* (1948), edited by Lyman Bryson of Teachers College, with contributions by Margaret Mead, Whitney J. Oates, Harold D. Lasswell, Wendell Johnson, Irving Lorge, Paul Lazarsfeld, Robert K. Merton, Lennox Grey, Leo Nejelski, James Mitchell Clarke, Charles A. Siepmann, Robert D. Leigh and Joseph M. Goldsen; and in the journalism-mass media-research-minded *Communications in Modern Society* (1948), and *Mass Communications* (1949), edited by Wilbur Schramm of the University of Illinois.[7]

These earlier studies did not focus explicitly on the education of teachers or the development of instruction, although the Waples and Bryson collections had strong educational implications. Sensibly, all were intent on the range rather than on immediate educational applications. While all were concerned with present and potential research, none sought to fix the economy of research in communication, beyond a tacit recurrence to the utility of the "Lasswell formula," which Irving Lorge, Joseph Klapper, and Louis Forsdale discuss in their articles: "Who—says what—to whom—in what channel—with what effect?"

But these present articles show a convergence on the question of economy in educational research and instruction: At

[7] Contributors to these volumes include: Fred S. Siebert, Charles V. Kinter, Raymond B. Nixon, Carl Hovland, Edgar Dale, Leo Lowenthal, Ralph O. Nafziger, Elmo C. Wilson, Hugh M. Belville, Jr., John E. Ivey, Jr., Clyde Hart, Bernard Berelson, Ralph D. Casey, Robert J. Blakely, Robert E. Park, Llewellyn White, Terry Ramsaye, Robert D. Leigh, Harold D. Lasswell, Edward P. Cheyney, Robert A. Brady, Neil H. Borden, Wendell Johnson, Daniel Katz, Wilbur Schramm, Margaret Mead, Hadley Cantril, Gordon Allport, Frank Luther Mott, Martha Wolfenstein and Nathan Leites, Kenneth Baker, Rudolph Arnheim, Patricke Johns-Heine and Hans Gerth, Rudolph Flesch, Paul Lazarsfeld and Patricia Kendall, Lester Asheim, Walter Lippman, Douglas Waples, John Dollard, and Lewis Wirth.

what points—with what instruments and techniques—for what demonstrably important purposes of general and special education—can we most suitably direct our time, effort, and resources—remembering that there are other important educational enterprises too.

Solon T. Kimball's "Anthropology and Communication" carries forward with marked incisiveness the strong concern with cultural symbols, patterns of culture, and other anthropological considerations which Lyman Bryson constantly emphasized as chairman of the Teachers College interdivisional course, interdivisional program, and research seminar in communication from 1946 to 1953.

Irving Lorge's "How the Psychologist Views Communciation" is a selective revision and extension-to-date of his article on "The Psychologist's Contribution to the Communication of Ideas" in *The Communication of Ideas*. His lectures in the interdivisional course, and his course in the Psychology of Communication, have been constant reference points in the interdivisional program, looking toward phase 3.

Philip Phenix's "A Philosophic View of Communication" focuses sharply on some of those problems of philosophical concept and definition which have been central in the Teachers College interdivisional course from the time when the staff first secured permission to mimeograph and distribute extracts from George H. Mead's *Mind, Self & Society* (1934) on symbolic processes and the "self-other" relationship in communication, subsequently brought into comparative relation in the course with concepts of communication in philosophical systems from Plato and Aristotle to Peirce, Dewey, Whitehead, and Susanne K. Langer.

Howard Fehr's "Communication of Scientific Thought" offers the substance of his lectures on mathematics as communication in the interdivisional course for the past three years—lectures which students have invariably found stimulating as they have taken a fresh look at the resources of a supposedly familiar field. In the establishing of focal points, it seems fairly clear that no comprehensive studies in communication can proceed far without constant awareness of mathematics as communication, as well as calculation, in itself and in the sciences.

Joseph Klapper's[8] "Studying the Effects of Mass Communication" indicates not only the utility of the "Lasswell formula," but how many matters of concept, mathematic calculation and communication, language and other means of symbolization may enter into seemingly technical procedures in communication research.

Marshall McLuhan's[9] "A Historical Approach to the Media" represents part of the rich exploratory research program underway in the University of Toronto, with particular reflection of the influence of the historical-political studies of H. A. Innis into the relation of patterns of culture to modes of communication.

Francis Shoemaker's "Communication Arts in the Curriculum" relates to Phenix's

[8] Joseph Klapper is Research Associate at The Bureau of Applied Social Research, Columbia University. Other Columbia University faculty members participating periodically in the Interdivisional Course include Professors John Hohenberg (School of Journalism), Eric Barnouw (Center for Mass Communication), Paul Lazarsfeld (Bureau of Applied Social Research), Robert D. Leigh (School of Library Service), and Herbert Hyman (Department of Sociology).

[9] Marshall McLuhan is Professor of English, St. Michael's College in The University of Toronto. Other visiting lecturers in the Interdivisional Course have included Irving Gitlin (Columbia Broadcasting Company), Harold D. Lasswell (Yale University), William Agar (United Nations), S. I. Hayakawa (International Society for General Semantics), William D. Boutwell (*Scholastic Magazines*), Henry Simon (Simon & Schuster Publishing Company), Susanne K. Langer, and Gilbert Seldes.

philosophical article, and moves into the departmental test phase and beyond—taking some of the concepts of the arts from Susanne Langer's *Philosophy in a New Key* (1942) and *Feeling and Form* (1953) which have proved useful in the Interdivisional Course, in the study of literature in English, and in research seminars on the relation of the arts and exploring their possible applications in broad curriculum studies. Uninitiated and mixed groups of students found them intelligible and stimulating in an all-college lecture session on curriculum in the Summer Session, 1955.

Louis Forsdale's "Helping Students Observe Processes of Communication" takes two of the models or constructs which have been developed by communication scholarship and examines ways in which those models can be adapted or "translated" for use in undergraduate and high school general education courses by imaginative teachers and students who seek clearer ways of seeing communication as a process.

Lennox Grey's "Test Case" relates the experience of the Department of the Teaching of English and Foreign Languages in working with ideas about communication from many fields. Because the first strong practical demands in Teachers College have come for instructors in college freshman communication courses (elsewhere the first demands have apparently come first in library schools or schools of journalism, which we do not have), this department has been one natural first proving ground for the ideas in action. But members of the department, represented by three articles here (so also is Foundations of Education), believe that the ultimate role of studies in communication will not be to strengthen one field (they have done that, certainly) but to provide needed coordinations among many fields—coordinations not yet adequately provided by the divisional synthesis of the Humanities, Social Sciences, and Natural Sciences, or the more inclusive but often unfocused core programs as we know them now.

The brief final section, "Next Steps," preceding the bibilography, raises key questions as to where we go from here—something for no one person to say. They are for consideration of the Interdivisional Committee and Seminar, and for any other professionally minded readers who are seriously concerned with communication and interested in sharing our interdivisional quest.[10]

Here, then, nine articles plus foreword, postword, and bibilography, report test borings at various promising points in the broad and varied communication field. They offer only a few from the many possibilities held out in the bibliography—which, while long, itself represents twelve years of educational selection. The aim has not been to represent in the articles all fields essential to a comprehensive modern study of communication and the communication arts. We have no question about the indispensable ideas and disciplines in the visual arts, music, speech, library science, and other fields not directly represented by articles but found in the bibliography. Those have been abundantly demonstrated. The aim has been to provide a manageable few for first illustrative materials for phase 3. If these are serviceable, others will follow.

Staff, INTERDIVISIONAL SEMINAR

[10] Such readers are invited to write to Professor Arthur R. Young, Chairman, Interdivisional Committee on Communication and the Communication Arts, Teachers College, Columbia University.

Anthropology and Communication*

SOLON T. KIMBALL

PROFESSOR OF EDUCATION, TEACHERS COLLEGE

THERE are three areas of anthropological endeavor which are related to the subject of communication. The first and at present most fully developed aspect has been concerned with the relatively narrow field of linguistics. The need to learn and record native languages posed a practical problem for anthropologists which they had to surmount in order to study the culture of native peoples. Boas and his student Sapir are recognized for their accomplishments in this early period. Subsequent scholars have refined and advanced the techniques until today linguistic analysis is on a scientific basis.

The concern with language as a function of culture is a second major area. Its genesis may be correlated with the rise in emphasis upon functional analysis as a method of cultural interpretation. Relationships were sought between the structure and meaning of language and other aspects of cultural behavior. Some of the descriptions of kinship systems illustrated vividly the interconnections. But understanding was also sought of the relation of language to modes of action, systems of logic, values, and world view. Malinowski, Whorf, and Hoijer are representative of interest in this area. Their analyses have shown the relationships between language structure and thought processes and ultimately the connection with cultural forms. My own experience among Navaho Indians may serve as an example.

The structure of Navaho language expresses a basic philosophical view of the world. Thus a Navaho does not say, "I am sick" or "I am hungry." Such concepts indicate an active state of feeling or of being, and are related to a perception of the individual and his relation to external forces characteristic of Western civilization. Our language gives expression to the implied control which the individual may exercise over aspects of the external world. The Navaho, in contradistinction, when he is talking about sickness or hunger says, "Sickness enters (or dwells) within me" or "Hunger is within me." The Navaho views himself as a responsive item within a world of forces. In fact, Navaho mythology explains that when the world was being readied for man's habitation, the spirits of Sickness, Hunger, and Poverty were permitted to remain abroad that man in experiencing them would understand Health, Repletion, and Wealth.

The third area with which the anthropologist is concerned is that of the relationship between cultural and social systems and communication. This interest is

* Professor Kimball is a past president of the Society for Applied Anthropology and a Fellow of the American Anthropological Association. He has conducted research among various peoples, including the Irish, Navaho Indians, Japanese-Americans, and American urban and rural communities. The present article is based upon a recent community study in Alabama.

particularly strong among those who have studied contemporary institutions and communities. The transfer of anthropological methodology to complex civilizations has produced some distinctive results and met with some new problems. When anthropologists studied a people with a simple culture and limited population it was possible to grasp the whole of the culture. But field work in a tribe of three or four hundred people in South America or New Guinea is vastly simpler than in an American city. The emphasis upon wholes, however, represents a distinct contribution.

Inevitably, the anthropologist has also brought with him other perceptions which had been developed in the study of simpler peoples. Primarily, these perceptions pertained to notions of structure in the relations between persons, and differentiation of groups based upon similarities in behavior or characteristics. It should be emphasized that these two types of social structure are quite different. Groups based upon similarities in behavior are exemplified by age classes, sex groups, or any other category which permits lumping people together in terms of their external characteristics. There is no necessary implication that those within the category relate themselves to each other. A contrasting group is exemplified by the family, in which interaction provides the basis of cohesion. Obviously, the anthropologist is also concerned with such symbols of group behavior as language, aesthetics, tools, and values.

American society distributes these symbols differentially among occupational and socioeconomic groups which we call social classes. One should understand that social class definition is basically an attempt to describe the distribution of characteristics. As a specific example, members of one social level will possess a distinctive accent and vocabulary, and will respond to words differently from those at another social level. Material items such as houses, rugs, and refrigerators are viewed differently by members of the various social classes.

The contrasting type of social group is one based upon a stabilized system of social relationships. The family represents such a social grouping and is different in kind from the type labeled social class. It must be examined by techniques which are quite distinct. The goal is to examine the dynamics of human beings in interaction, living within a habitat or given type of environment. The habitat includes not only the physical items of that environment but also other persons and the prevailing moral and ethical codes. When we isolate the habitat in this manner it is quite possible to view any community as if it were a separate group for which the surrounding world constitutes a portion of the setting. In addition, communities and their constituent groups possess a past, are repetitive in their organization and activities, exhibit an internal equilibrium, and thus yield to methods of systematic analysis. The methods of science are applicable to the extent to which we are able to isolate the components of the social systems and to observe the effect which a change in one of these components has upon its particular system.

COMMUNITY BACKGROUND AND SOCIAL STRUCTURE

The foregoing remarks provide the background generalities against which it is my purpose to examine a specific community in terms of the communication process. This community, Talladega, is found in the Piedmont area of east-central Alabama. It is a county-seat town of 13,000, with a diversity of industries, but primarily textile mills and iron foundries.

Beginning in the spring of 1951 a research team from the University of Alabama formed a cooperative arrangement with citizens to observe the process by which a community organized and carried through a self survey in the area of health. The goal was to describe the processes of community action in which individuals and groups work together.[1] A brief description of the setting will aid later analysis.

Talladega had recently experienced changes characteristic of many Southern communities that had felt industrialization. In 1890 there were about 2,000 inhabitants, half of whom were Negroes. At that time the town was a distributing and collecting center for the surrounding area. As county seat, it was also a center of government. The earliest industry was textile manufacturing, established at the end of the century. Workers were recruited from the surrounding countryside, where small farmers with large families were no longer able to care for the excess population by dividing their land or sending their members to the frontier. Jobs and company-built houses provided them with a living and residence in the newly built mill villages. In subsequent years there was a gradual accretion of new industries, but it was not until World War I that town growth through industry was accelerated. World War II stimulated further development, and by 1950 the population had jumped to over 13,000, of which approximately one-third were Negroes and two-thirds were white people.

The South has frequently been described in terms of the differences between white people and Negroes and the relations between the two. The class divisions within each of the color castes have also been described. Talladega resembles other Southern towns in the separation of the races. Observation readily verified social divisions based on race. What had not been previously described, however, was the sharpness of the division of the white population into two classes of approximately equal numbers, a fact of immense significance in the organization of the town and of the events we observed. Each of the white groups could be identified by differences in lineage, background, occupation, residential area, religion and other factors. The relations between them showed some similarities to those which characterized the color castes.

The subordinate white group was composed of industrial laborers and mill workers. In the main, they were recent arrivals from the surrounding countryside. The urban modification of their outlook and customs was only beginning and they retained identification with their place of birth. Although their jobs and homes were within the boundaries of the town and their children attended the public schools, they were strangers to town life in spirit and separated from the main flow of community action.

The socially and economically favored white group presented a contrast in behavior and characteristics. There were many families which could trace their lineage to the founding of the town. Although wealth and occupation showed great diversities, there was a common pattern of manners and viewpoint which gave the whole an internal cohesion of great importance. Those who were active in the affairs of the town were of this class. They exercised their responsibilities for the functioning of the institutional arrangements which met the civic, educational, economic, religious, and social

[1] Solon Kimball and Marion Pearsall. *Talladega Story; A Study in Community Process* (University, University of Alabama Press, 1954).

needs. Thus, it is no surprise that the initiators of the Health Inventory, the activity we observed, were members of this group.

We discovered that the nature of the internal social divisions set the framework within which community action moved. Similarly, communication within or between these groups was aided or impeded depending upon the nature of the traditional relationships which bound or separated them. In summary, the town was composed of three major segments, Negroes, white laborers, and the "community." Members of the third group provided leadership in this as in previous community enterprises. This discussion is concerned with the nature of communication within each of these groups and between them. Let us now turn to the first organizational steps and examine the nature of the communicative process.

THE PROCESS OF INITIATING COMMUNITY ACTION

There is a logical but incorrect assumption that an activity which is community-wide would need community-wide approval. The experience in Talladega showed that a mere handful could make decisions which bound the community to a course of action. Thus, the initial hurdle faced by the sponsors of the Health Inventory was to secure a favorable response from those whose influence and position placed them in the forefront of leadership. An obvious first step could have been a public meeting to sample opinion, but as is true of so many obvious actions this procedure would have been contrary to the traditional way in which effective communication occurs. In fact, during the first several weeks the word was passed in the casual and informal gatherings of persons as they moved in the workaday world. Eventually, there was an *ad hoc* gathering of some twenty persons whose approval helped to convince the executive committee of the Chamber of Commerce that it should sponsor the initiation of the study. The publicly announced sanction of an established town organization provided the necessary legitimacy to seek support on a wider base. It was only then that the sponsors decided to hold an organizing meeting to which representatives from all religious, civic, social, and economic groups would be invited.

This first public meeting, held in the county courthouse on a hot June night, offered the opportunity for insight into several aspects of the communication process. The events reaffirmed that communication, to be effective, must flow through already established channels in culturally understood fashion. The meeting, although public, was also an invitational affair. The nearly one hundred persons who attended represented the majority of organized groups invited. Among these were a few from organized labor. They are specifically mentioned because this was the first and last time that such representatives attended public meetings. There were no Negroes in attendance. It is true that Negro groups had not been formally invited, since it had been planned that in keeping with the tradition of racial separation they would have a separate organization. Nevertheless, theoretically they could have attended. The failure of Negroes or white laborers to attend was further evidence of the three-way division of the town's population and posed problems as to how the communication process varied within and between each group. What were the cultural devices traditional to each group? In order to answer these questions we shall examine the customary ways in which these groups were related.

NEGRO-WHITE RELATIONSHIPS

Let us look first at the traditional way in which white people and Negroes communicate with each other. There are two main types of race relations: the older paternalistic pattern, which is diminishing in extent, and the emerging pattern, which is less personal, and likely to be expressed within formal institutional arrangements. In the former, personal relationship is oftentimes established between white and Negro families where a Negro woman or man performs domestic duties for the white family. The relationship is one of mutual help in times of crisis. The events of life are shared, although each knows and enforces proper behavior upon the other. There is common respect and oftentimes deep affection within these bonds.

The second type of relationship is supplanting the paternalistic one, with the shift from agrarian to industrial economy, the rise of cities, and the appearance of a Negro middle class. In Talladega, it found expression in all , institutional arrangements, except the family, where the relationship remained paternalistic. An interracial ministerial council gave some unity to church groups. In industry, government, and education the arrangement is one in which the Negro occupies a subordinate position within a formal structure. All of these systems provide channels through which relationships are maintained and communication occurs. It should be no surprise, then, that the chairman of the Health Inventory, in order to involve the Negroes in its activities moved through the white superintendent of county schools to his supervisor of Negro schools, who was requested (a request she could hardly refuse) to initiate the organization of a survey group among the Negroes. Eventually, a Negro committee was established and in conjunction with the white community completed a survey of health conditions.

The attempt to establish working relations between the leadership of white and Negro committees met some difficulties. The cultural framework within which Negro–white relations had operated formerly did not provide a clear pattern. A civic enterprise of this type fitted neither the paternalistic nor the institutional pattern, and the prevailing beliefs around race did not permit an equalitarian biracial effort. There were a few white people who could have worked within a biracial organization, but there were many more who would have had no part in such an arrangement. There were a few Negroes who objected to the segregated program, but there were others willing to work within the traditional arrangement and many who would have had great difficulties in adjusting to any deviation from it.

These uncertainties in the relations between the two groups made communication erratic and difficult and undoubtedly hampered the efforts of the Negro committee. Time and again the problem of coordination between the two groups arose. The need occasionally led to a meeting of small biracial groups in the Chamber of Commerce offices, but free discussion was difficult. The culturally defined dominant position of the white group, the old habits of deference, the surroundings, unfamiliar and traditionally taboo to Negroes, militated against free discourse. Polite words were spoken, but there was no communication in the real sense of the word. Perhaps if some of the conditions could have been changed a real community of interest would have arisen, but it would have had to survive in a generally unfavorable environment of cultural segmentation.

PARTICIPATION OF WHITE LABORERS

The participation of white laborers in the Health Inventory provides us with a contrast to that of the Negroes. It should be remembered that this group constituted approximately half the white population but that its members possessed many characteristics which set it apart from the dominant middle class which controlled town life. Traditionally, the laborer participated in civic affairs no more frequently than the Negro, although theoretically his skin color gave him free access. This difference was reflected in an early policy decision that the two races should organize their separate committees. The decision regarding laborers was quite another one. In this instance the attempt was made to include the laborers through election of a labor union official to the executive committee. The individual who was elected failed to attend any of the meetings. Nor did others from this group take part in the public proceedings. If it had not been for some special efforts the laborers would have had no part, and as it was, their role was considerably less than that of the Negroes.

Some understanding of the failure to involve this third of the town's population can be gained through examination of a specific situation in which an attempt was made to involve a working-class neighborhood in the Health Inventory. The results illuminated the almost unbridgeable contrast in values, communication rituals, and procedures of action between middle-class and working-class people.

The chairman of the Inventory, prodded by criticism that it was the "same old gang" running the study, visited the West End, a working-class neighborhood, and there sought to enlist the interest of several persons with whom he had some acquaintance. He was greatly impressed by the favorable response, combined with expressions that they had been waiting to be asked to take part. He encouraged them to arrange a public meeting and invite their friends.

The meeting was held in a neighborhood church a few nights later. A group of about twenty-five, all but two or three of whom were men, had assembled. The delegation from the "other side" of town included the mayor, a respected minister of the town's leading church, the chairman of the Inventory, and members of the research team. In the ritual of communication habitual with the middle class, each of the visitors spoke in turn of the objectives of the enterprise and urged that the local group join them in making a survey of neighborhood conditions. Those who responded first expressed appreciation and approval and then described in great detail the prevailing conditions under which they lived. They expressed the need for sidewalks, paved streets, sewers, and playgrounds for their children. They needed to make no survey. They and all others present knew the menace of the open-pit toilets, the hazards their children experienced in walking to school, and the plight of families afflicted with tuberculosis. What they wanted was corrective action, and for the answer they turned to the mayor, who attempted to explain the details of petitions, engineering surveys, tax assessments, and other bureaucratic and legal requirements which must be satisfied. The spokesmen wanted to know how fast action might be expected. At this point dissident voices were raised. Objections were made that the tax burden would be insufferable and that property owners would be threatened with tax confiscation. Heated words flew between the pro-

tagonists, and attempts to smooth ruffled tempers proved unavailing. The meeting was adjourned, but in the churchyard the controversy was continued with threats of physical violence. The visitors departed, having failed in their goal to organize a survey and were thus unable to cope with the internal divisions. It was also a failure in that middle-class techniques and processes of communication had proved inadequate. The laborer's world was one in which need prompted action, in which the intensity of individual decision was in conflict with the processes of group action. Certainly, it was demonstrated that a part of the isolation of the laborers from the rest of the community rested in cultural differences that prevented participation in middle-class activities.

DIFFERENTIALS IN THE COMMUNICATION PROCESS

The differential relation between Negroes and white laborers and the dominant middle-class segment of the town provides us with both contrasts and similarities in the communication process. Both segments occupy a subordinate and relatively isolated position within the community. But their relatively equal structural position does not provide the basis for a common bond between them. In fact, it would seem that tenuous as the ties to the dominant white group may be, each is more closely bound upward than laterally. Actually, there are no institutional arrangements or even informal devices which unite these two subordinate classes. Irrespective of potential political and economic adherences, for the moment, Negroes and white laborers are separated by cultural barriers of great height. Thus, although the groups possess commonly shared opinions, there is no community of interest and their relations are casual and erratic. Where men are thrown together on the job, there is a limited amelioration of the exclusiveness.

The attempt of leaders of the Health Inventory to stimulate organization met with quite different response in each case. Among the Negroes a portion of the response could be interpreted as an attempt to please the white people. And in intermittent biracial discussions long habits of deference and timidity on the one hand, or of superior white behavior on the other, prevented close cooperation.

In contrast, the initial failure of white laborers to respond to a general civic invitation to participate came from their reluctance to take part where they had not been asked. Their strongly held values of individual independence and equality, a product of the frontier and rural neighborhood background, do not permit a man to attempt superiority over his neighbors or allow him, in good grace, to place himself in positions where he is snubbed or excluded. He is free of the deference of race, although he holds respect for the leader and the man of education. Thus, the enthusiastic response accorded the personal invitation to take part assumes meaning in terms of the cultural values. The fiasco of the meeting between representatives from the two parts of town, and of separate social systems, may be seen as evidence of the difficulty with which persons from different cultural worlds establish communication with each other. The problem was one of the traditional devices, communication ritual, modes of action, and point of view which both characterize and separate.

IMPLICATIONS AND CONCLUSION

One of the objectives of the research team was to observe the processes and results of the attempt to involve an entire community in a survey of health condi-

tions. Obviously, the success of an enterprise of this type depended upon creating understanding of the goals, developing acceptance of these plus willingness to participate, and finally, an opportunity to take part. Only through skills in communication could this be accomplished. We must understand that however important instruments and content of communication may be, they are powerless to bring change in values or promote action unless the human situation provides a favorable environment.

Anthropology offers evidence that cultural and social systems constitute the ultimate components of the communication process. The social systems themselves form the intricate network of traditional human relationships within which decisions are made and actions taken or rejected. The activities of persons within these systems have been shaped by customary practices which, in turn, facilitate or impede communication depending upon the degree of their conformance to values and techniques. The anthropologist would conclude, and the illustrations presented here have been for the purpose of providing substantiation, that the practitioner of communication arts must also learn to understand and operate within these systems.

How the Psychologist Views Communication*

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THE verb "to communicate" has many meanings. Its Latin roots carried the significations of dividing and sharing, of making common to many, and of imparting. These senses survive in the current meanings of to transmit, to impart information, and to share and enjoy in common. Thus, the dictionary now distinguishes among the three aspects of communication so as to separate process, message, and effects. These aspects cannot be separated except for emphasis in exposition. The psychologist brings them together by his definition of communication as the process by which an individual transmits stimuli to another to modify the receiver's behavior. Such a definition implies that the communicator may be his own receiver. The communicator may modify his own behavior in and by the very act of talking to, or writing for, himself as well as for others.

Communication thus involves the reciprocal interactions of sending and receiving signals, of composing and understanding messages, and of sharing and enjoying ideas. These three interactions may be likened to interrelated stages involving the areas of engineering, psychology, and sociology. The engineering aspect deals with the means by which signs are sent and received accurately regardless of their meaning. The psychological emphases are concerned with acquisition of language in its variety of meanings. The social level deals with consequences of interchanges of communication.

CODE AS COMMUNICATION

In the transmission of messages in telegraphic code, many of the psychological problems in communication are revealed dramatically. What are the difficulties in learning to send and receive code, or what are the possible confusions between different code signals? Keller, in a succinct historical review of the development of Morse Code brings some of the problems into clear focus. He reports that "Samuel Morse designed his telegraph to record *visual*, rather than auditory, code. . . . The first Morse code was cryptographic. There were numbers for all of the letters and many of the words of the English language. Morse spent many hours building a 'telegraphic dictionary' to be used in coding and decoding messages. These hours were wasted. His dictionary was barely completed when he decided to use an 'alphabetic' code in which each letter had its own signal."[1]

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[1] Fred S. Keller, "Stimulus Discrimination

The visual Morse code very quickly gave way to the now well-known auditory code, because telegraphers found it more practical to listen to the *sounds* the instrument was making than to view the graphic record. Indeed, operators became so adept that they were able to identify the individual who was sending the code, by his "touch" or sound pattern.

The transition from visual to auditory code indicates that adults found it easier to get the message by hearing than by seeing. Essentially, the experiences of the early telegraphers suggest that accuracy in receiving messages can be increased when the proper sensory modality is utilized. When a person suffers from a sensory handicap, it is necessary to substitute different means for reception and transmission of communication, such as tactile reception of Braille patterns by the blind, or visual reception of manual signs and gestures by the deaf.

Morse, in developing his graphic code, originally had planned to use a sequence of from one to ten dots to represent the digits 1, 2, 3, 4, 5, 6, 7, 8, 9 and 0. He realized, however, that adults cannot judge quickly and accurately at a glance the differences among five, six, seven or more dots. Accordingly, he adopted the dots, dashes, and intra-signal spaces which now constitute American and International Morse. The kind of discrimination that the individual had to make necessarily limited the nature of the pattern that could be used.

Still another communication problem is illustrated in the reception of American Morse code. Keller reports that a defect of the code was the possible confusion of five code signals: 6, P, H, 4 and 8. Unless 4, 6, and 8 occur in a context of numbers, 4 may be called V, 6 may be called P, and 8 may be called B. As for the letters when alone or in cipher, P may be called H, and H may be called S. In the absence of meaningful context, the signals may be misheard or misunderstood.

Of course, in the absence of context, any external noise or any momentary lapse of attention by the receiver may lead to a misunderstanding of the signals and a distortion of the message. Engineers try to develop mechanisms that will minimize the errors in reception by reducing the amount of irrelevant noise in the channel of communication. Examples of such disturbing noise would be static in radio reception and engine noises in airplanes and submarines. In reading, the analogy of noise would be the lack of adequate contrast between the print and the page, or an excessively small type size for the reader.

Telegraphic code may be sent as a cryptic message or in the clear. Cryptic code is used to conceal the message from all but the intended receiver. Usually, cryptic code is some very specialized arrangement of letters which when referred to a code book can be deciphered to arrive at the proper meaning. For instance, the five-letter sequence P Z H A V may be a cryptic message which in the clear means "Happy birthday and many good wishes for the years to come." If the message were sent in American Morse, the receiver might mishear the code and record it as H Z S A V. Obviously, there would be no internal evidence to suggest that the H should have been P or the S should have been H. On the other hand, if the message had been sent in the clear, so that the receiver knew that all words transmitted were to be English, he could have utilized his learned knowledge of English to check the reception. For example, if the telegrapher had been recording,

and Morse Code Learning." Transactions of the New York Academy of Sciences, Series II, Volume 15 (April), 1953, pp. 195-203.

"Plans are beginning to take . . ." and heard as the next word "S H A H E," it is quite likely that he would write the word "SHAPE" either consciously on the assumption that the sender had made an error, or unconsciously because of the familiarity of the whole message. The probability that the word had to be SHAPE may have been so great that the receiver wrote it as it *should* be.

In sending cryptic code, or in sending messages in a background of noise, there would be a marked advantage in transmitting the message several times. In the event of noise or accidental errors in sending, it is unlikely that the same noises or errors would occur at the same places in the message. An additional protection would be to have the receiver retransmit to the sender the message he had received. Examples of such repetitions are confirming an order, or calling back the directions in landing an aircraft. Whenever a message is composed of elements for which the receiver has little foreknowledge or expectancy, the repetition of the message decreases the probability of error. For the code message P Z H A V the receiver has no foreknowledge or expectancy that the letter following P is likely to be Z or that the letter after A must be V. In English, however, if SHA were received, certain letters would be quite unlikely as the sequel and others would be very probable. Further, the whole message increases the probability that the fourth letter will be P. Some shorthand systems, indeed, are based on the concept that it is not necessary to record all the letters of a word. For instance, in the Phillips Code which was developed to speed the telegraphic transmission of press reports, the word *acquit* is abbreviated as *aqt*, *acquitted* as *aqtd* and *acquitting* as *aqtg*. The letter *u* in acquit is redundant in that it does not add information to the transmission of *acquit*. In English, *q* is always followed by *u*. Actually, the *c* does not really add very much either.

Redundancy in the sending of a message refers to an overdetermination of its reception. Redundancy can be increased by repetition of the message either by the sender or by the receiver, or redundancy exists because the receiver has learned the probabilities in messages. The probabilities can be within words, as in expecting that the next letter after TH is E; or it can be among words in meaningful sequences, as in the message "Plans are beginning to take . . ." for which the learned sequel is in the idiom "to take shape." Redundancy, whether learned by experience or planned as a technique to overcome noise, increases the probability of correct reception at the expense of increasing transmission-reception time or effort.

LEARNING CONTEXT

The advantage of learned redundancy is illustrated in the classical study by Bryan and Harter[2] in the way student telegraphers learned their trade. In one experiment, the amount of improvement in sending and receiving messages in the clear and in cryptic code was compared. Three conditions were contrasted: connected discourse, unrelated words, and letters in cryptic code. The rate of improvement was most rapid in connected discourse, somewhat less rapid in words, and markedly less rapid in independent letters of cryptic code. The difference is probably attributable to the fact that the

[2] William Lowe Bryan and Noble Harter, "Learning a Life Occupation: The Telegraph Operator," in William Lowe Bryan, Ernest Hiram Lindley, and Noble Harter, *On the Psychology of Learning a Life Occupation*. Indiana University Publications, Science Series No. 11, 1941, pp. 69-129. (This is a reprint of the reports that originally appeared in the *Psychological Review*, Vol. 4, 1897; Vol. 6, 1899.)

young adults were able to utilize their previously learned knowledge of the sequence of letters in a word or of words in a sentence. The greater improvement for connected discourse illustrates the potency of positive transfer from early to later learning. The three kinds of skill—letter, word, and discourse—all show improvement, but the rate of gain depends upon the previously over-learned language habits even though the student was not completely aware of the kind and amount of his previous acquisitions. It may be hypothesized that the plateaus Bryan and Harter found in learning to receive telegraphic code are attributable to the previously learned language patterns of letter sequences in words, word sequences in sentences, or idiomatic sequences in connected discourse. It is not so much that "a hierarchy of habits" develops in the course of practice as that previously acquired language habits can be transferred, in whole or in part, to the new task.

In connected discourse, context implies expected word sequences. Indeed, one definition of context may be in terms of conditional probability dependent upon previous occurrences. For instance, the probability that *Plans* will be followed by *are* may be less than the probability that *Plans are* will be followed by *beginning*. Hundreds upon hundreds of successful experiences with word sequences give the individual these probabilities even though he may be unaware of them. The probabilities that are learned depend upon the nature of the language to which he has been exposed. Each language has its own orthography, syntax, and idioms. How, then, are these patterns learned?

The new-born infant does not need to develop or invent the gestural, vocal, or written language. While many theories have been created to account for language, so far none has been substantiated. Whether language originated as a form of vocal imitation of gestures or as a response to strong emotional stimulation is not nearly so important as the fact that hundreds of different vernaculars exist.[3] No child has ever learned his society's vernacular without the intervention of at least one other human who had knowledge of the language. Many people would like to believe that human infants could develop a language of their own by themselves. Occasionally, they suggest that the so-called "wolf children" create their own language for themselves. Exciting as such a demonstration would be, no case of a "wolf child" has ever been authenticated. Indeed, the evidence suggests that such a doctrine is not very probable. Goldfarb's study of foundling children reared in the absence of the social stimulation of language play between parent-surrogate and child suggests that a human must give the infant the rudiments of language.[4]

LANGUAGE LEARNING

The infant, at birth, does cry. It probably does not have available, however, the mechanisms for making all the phonetic sounds that constitute speech. Infants must develop not only in the ability to make sounds but also in the sensory modalities to receive signals. Auditory acuity, for instance, is not fully developed until about the twelfth year, and visual acuity somewhat later. Research does indicate, however, that within the first six

[3] UNESCO, *The Use of Vernacular Languages in Education*. Monographs on Fundamental Education, VIII, UNESCO, Paris, 1953, 154 p.

[4] William Goldfarb, "Infant Rearing and Problem Behavior," *American Journal of Orthopsychiatry*, 13, 1943, 249-265 (April); and "Variations in Adolescent Adjustment of Institutionally-Reared Children," *American Journal of Orthopsychiatry*, 17, 1947, 449-457 (July).

to nine months, the child develops the ability to utter any sound or pitch variation necessary to speak any vernacular. Children reared by Chinese-speaking parents or by surrogates whose vernacular is Chinese learn Chinese speech. Children brought up by Bantu-speaking parents or their surrogates whose speech is Bantu learn that speech pattern. It is interesting to speculate that in the United States, four million newly born infants each year learn the language patterns from their parents and the other children or adults in the family unit. No two families provide the same training or experience, yet the vast majority of these infants will acquire not only the language pattern for making and receiving communications within the family but, more significantly, sufficient speech to be able to understand and be understood by others. The learning of language by the infant is, perhaps, the most beautiful demonstration of teaching and learning. In the course of learning the vernacular, some speech sounds will be reinforced or rewarded, and some speech sounds will not be reinforced. Within a very few years the child will be able to utter reinforced sound patterns but may not be able to make the sounds that were never or rarely rewarded. For instance, Chinese adults may find it difficult if not impossible to say the *l* sound, substituting for it the nearly equivalent *r* pattern.

As the child learns the sound patterns that will bring him attention, comfort, and food, he acquires more than speech. He learns the names of people and things, the tonal pattern for demanding, asserting and questioning. But even more, as the child learns his vocabulary and tonal rhythms, he gets attitudes and values. He learns which sound patterns are acceptable enough to bring satisfaction and reward, and also those which the parents prohibit and taboo. Learning the vernacular is more than acquiring the words and syntax. Language learning by the young child means learning the culture in which he lives and grows. Learning language means learning to behave as a human in the society. Language, for the child, is a way of behaving. It is not, initially, a mode for thought or for reflection. Of course as the child matures he can use language in specialized ways. In early life, however, it is the means by which he gets control from the environment, and by the same token controls the social scene.

Psychologists have recognized the importance of language development. One of the measures of child learning is the number of words that a child knows in the sense of understands. Vocabulary probably increases steadily from the first year of life to beyond the sixtieth birthday. Vocabulary has been used as an index of intellectual development. Certainly it is an important measure of the rate of learning the culture. The child acquires during the lifelong process of learning his language the concepts as well as the cultural values.

In the early learning of language, it is the individual child who *individually* learns the cultural expectations. The family unit teaches the child its language, but the speech the child gets is social. It is the means by which any individual can (and usually does) interact with other individuals and with groups. Sociologically, the language the child acquires reflects not only the taboos but also the social sanctions. The very words developed within a society are indicators of the social goals as well as the significant features of the local environment. In any vernacular, word counts of the most frequent words and their most frequent meanings give a concrete measure of the

more important aspects of the society.

By the time the child is five years old he has had the relation between words and values so strengthened that he has become conditioned to behave with certain probabilities to words and word patterns. Sophisticated adults, too, will probably respond in certain ways to language. "I am now going to serve you a delicious charcoal-broiled steak, some lettuce and tomatoes, and a baked potato" may bring about salivation and certain anticipatory gustatory reactions in you. The extent of these reactions will depend upon the time you read the sentence, the amount of attention you give it, and the amount of belief you have that the promise will be fulfilled. Your behavior cannot be predicted with certainty but your probable behavior may be estimated in the sense that it can be ascertained what proportion of people would salivate or would feel pangs of hunger.

UNDERSTANDING COMMUNICATION

The effects of the sentence, moreover, depend on your understanding of it. What does *understand* mean? The word has many meanings. It includes such senses as "to get the idea of," "to apprehend by way of information," "to have information about," and "to accept as significant."

Prerequisite to understanding a message is getting the message from the sender to the receiver. After that, understanding of the message is a complex involving getting the meanings of words, perceiving the relations among words, appreciating the intention of the sender, evaluating the significance of the message.

The concept of *understanding* has been used in the development of reading comprehension tests. Less than fifty years ago, one of the primary objectives in the teaching of reading was to achieve expressive oral reading. Children were evaluated by the quality of the dramatic rendition of the printed text. All too frequently, children who *read* well, did not understand what they were reading. E.L. Thorndike's famous "Reading as Reasoning"[5] demonstrated that elementary school children were not very efficient in comprehending the texts that they were asked to read silently. Thorndike's articles, and the series of reading tests he and William A. McCall developed, changed significantly the goals and the evaluation of reading instruction. The reading comprehension tests emphasized the appraisal of understanding by asking children to answer questions that gave indication of getting the meanings of words in context, getting the main idea of the passage, getting specific facts from the text, and making inferences and predictions from the materials read.

Now, with television, radio, motion pictures and other audio-visual mediums so readily accessible, as much attention should be given to the evaluation of listening and viewing. Can children get the over-all significance of an illustration, appreciate details in it, see relations among objects? Can children see the intentions of the producer of a television show? Intensive studies of the utilization of the newer communication devices are needed. Understanding of these devices, too, may be evaluated by asking children to answer questions. In a sense, the questions that the children must answer may influence the manner in which the materials—text, speech, or picture—are understood. The questioning technique, in a genuine sense, influences the understanding of the communication.

[5] Edward L. Thorndike, "Reading as Reasoning: A Study of Mistakes in Paragraph Reading," *Journal of Educational Psychology*, 8, 1917, 323-332 (June).

Nevertheless, tests of silent reading have indicated some reasons for malcommunication. Among these, were the textbook writers' use of a vocabulary so difficult or erudite that children failed to get the meaning of the passage because they did not know some of the key words. Or again, the sentence structure was so unusual that the child could not extricate himself from the maze. For instance, consider a sentence like "Were it not that King Arthur was grievously hurt, he would have gone to the wars." Not only are there some difficult concepts, but there is also the unusual sentence structure which may cause the young reader to stumble on his way to understanding and appreciation.

IMPROVING COMMUNICATION

Thorndike and other educational psychologists raised the question "Are the words in children's books the right ones?" They answered the question by assuming that the most frequent words in print were the ones the child should learn to understand. Later, the concept of frequency was extended to measuring the usualness of sentence structure and, more recently, to codifying the most frequent words by the frequency with which each of its different meanings was used in print. The frequency counts of words, of meanings, and of sentence structure significantly affected the preparation of textbooks, especially on the elementary school level. The psychologist provided the means for increasing the probability of comprehension of texts. Texts can be made more understandable by changing vocabulary, sentence structure, idea density, and idea sequence. About twenty-five years ago the first demonstration of the potentialities for improving communication by changing words and structure was made in the experimental evaluation of three contrived versions of the same content in an information bulletin for farmers. It was found that vocabulary with Anglo-Saxon roots, variation in sentence length, and logical organization from the known to the unknown would make a text not only easier to understand but also one the reader preferred to read.

The frequency counts and the empirical study of style elements were the forerunners of the so-called "readability formulas." These formulas were developed as a means for estimating the difficulty of texts for specified audiences such as school pupils and semi-literate adults. All readability formulas attempt to measure the over-all difficulty of a text in terms of internal structure. The items in readability formulas include one or more of the following: vocabulary difficulty, sentence length, idea density, and human interest. Vocabulary is measured by some indication of relative commonness of the words, such as that among the most frequent thousand or five thousand words in print, or by some estimation of relative difficulty, such as syllabic length. Sentence structure is appraised in terms of average sentence length. Empirical study has shown that the less usual sentence structures have the larger number of words per period. Idea density can be measured in terms of prepositional phrases, because phrases tend to be used to pack a text. Idea density, of course, can be estimated by the number of different concepts per hundred words. The greater the number of different nouns, for instance, in a hundred words, the greater the difficulty. Human interest is usually appraised by the relative number of personal nouns and pronouns, such as mother, father, you, and they. Each of these elements separately or in combination leads to an estimate of text difficulty. But important

as these elements are, they do not evaluate idea sequence or organization. To this degree, then, readability formulas do not measure all the elements that make for comprehensibility.

Mechanical manipulation of a text by selecting more frequent words, making shorter sentences, or eliminating prepositional phrases will not necessarily make a text easier. Changing "I am going to town" to "I am going townwards" does not make for greater comprehensibility. Readability formulas are not rules for writing; they are merely useful, but not completely efficient, yardsticks.

Comprehension is prerequisite to the effects of reading for enjoyment, evaluation, and action.

Lasswell has suggested a paradigm for studying public communication. Basically, the formula may be summarized as "Who says what to whom via what channel with what effect?" In the interchange between speaker and hearer or writer and reader, the comprehension of the communication involves not only understanding the content but also the nature of the communicator and his intentions. Social psychologists have been devoting an ever-increasing amount of attention to the individual and social consequents of communication. They are the historical successors to Aristotle in that they are attempting to evaluate the effects of communication. The rhetorician is concerned with how he got his effects. The psychologist would like to produce evidence about it. Variations in the text or in the speech will produce different effects in different individuals and in different groups. In general, differences in the speaker's or writer's gestures, use of aids, will not produce uniform effects in the listeners or readers. The very differences among the individuals in education, or in social and economic status, in motivations, and in emotional maturity will produce different results in the members of the reading and listening audience. Perhaps one of the greatest difficulties in social communication is that the communicator makes assumptions about the receiver's ability to understand the message. For instance, when he prepares a text, he may assume implicitly that if he knows the meaning of a word, or can comprehend a metaphor, or responds to an appeal, the listener or the reader, too, will understand, appreciate, and be motivated. Researches, however, now demonstrate the error of the implicit assumption about the nature of the audience. Certainly, except for two-way conversation, the best assumption about an audience is that it is variable in ability, in knowledge, and in motivation. The effects of communication always have an element of uncertainty. Nevertheless, much has been learned about the relation among characteristics of the communication, the way it is delivered, and the effects upon the audience in terms of enjoyment and action.

The psychologist studies all aspects of communication at all levels. He is concerned with transmission and reception of messages, with learning and comprehending ideas, attitudes, and values, and with appraising the consequences of communication in comprehension, pleasure and action. His emphases vary from the application of knowledge for the improvement of communication to the development of new knowledge about it. The communications revolution in no small part reflects his contributions.

A Philosophic View of Communication*

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THERE are many different conceptions and facets of the philosophic enterprise. This discussion illustrates one way of philosophic inquiry, applied to the problem of communication. The approach will suggest a framework of general ideas which may serve to clarify the meaning of communication in general and to provide a way of understanding some of the different modes of communication.

The procedure will be first to frame a comprehensive definition of communication and then to show how this formula applies to various kinds of communication situations and problems. The adequacy of the definition will depend upon how faithfully it represents the particular forms and how brightly it illuminates the relationships between them.

BASIC DEFINITION

Everything that follows depends upon this basic definition: *Communication occurs whenever a* sender *acts upon a* receiver *by means of some* vehicle, *so that some state or series of states of the sender —the* message*—is induced as a state or series of states of the receiver.*

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Sender and Receiver. The sender and the receiver may be any entities whatsoever. Ordinarily communication is understood as occurring between persons, but it need not be so restricted. One function of a philosophic interpretation is to show how the ordinary understanding of a concept may be seen as a special case of a much more comprehensive meaning. Consider some of the possible combinations of sender and receiver. Both sender and receiver could be merely physical entities such as billard balls, tuning forks, or electrical circuits, and the communication-event might then be the imparting of momentum by impact, the production of sympathetic vibrations, or the generation of induced currents. Again, the sender might be a physical system such as the stellar universe, the receiver a scientist, and the result of sender acting on receiver, the communication of intelligible order. The sender could be a person and the receiver a dog or horse to whom commands or expressions of appreciation are communicated. Both the sender and the receiver might be animals (for example, birds communicating warnings of hunters), or the sender could be a flower and the receiver a honey bee. Finally, the sender might be deity communicating revelation to a prophet or mystic as receiver, or the sender might be the devoted believer communicating in prayer to the deity as receiver.

Messages. In the definition, the message has been described as "a state or series of states." A state is a form or configuration which represents an aspect or a set of aspects of the condition of being of sender or receiver. The function of the communication act is to produce in the receiver the form or configuration designated by the message already actual in the sender. In the case of billard balls the message is a state of motion. For the astronomer it may be the successive configurations of the planetary system. To the dog's master it may be the imagined perceptual gestalt of "dog walking at master's heel." For the prophet the pattern may be "wicked city soon lying in ruins."

Now the nature of every entity is comprised of its proper or characteristic states. We know what a thing is only to the extent that we can specify the ranges and kinds of forms or configurations which it can assume. Thus, for example, a cat is an animal which can meow and scratch, and so on, but cannot write poetry or construct scientific theories as some human beings can. A stone can characteristically assume various states of motion and of temperature, but what we call "states of mind" in human beings are not proper to it.

It is necessary to distinguish three kinds of characteristic or proper states. First, there are actual states. These are forms which are in being, which represent existing conditions of an entity. Second, there are latent states, or forms for which the entity has full functional facility but which are not at present in being. Third, there are potential states, or forms which can only be actualized at a further stage of development of the entity. An illustration will make these distinctions clear. The state of a person actively cognizant of the truth of the proposition $2 + 2 = 4$ is an actual one. For the same person not actually focusing on this proposition, this would be a latent state. For the same person at birth it was a potential state. On the other hand, for certain kinds of mentally defective persons, or for a dog or cat, this state would not be proper or characteristic and hence never actual, latent, or even potential.

The point of this discussion about states is that they determine the possible content of messages which can be communicated. The basic proposition is this: *The possible messages are limited to those states which are proper to both the sender and the receiver.* In the communication-event, the state must be actual in the sender. If it is also already actual in the receiver, the communication is one of confirmation. If it is latent in the receiver, the communication is one of recall. If it is potential in the receiver, the communication involves learning (or its analogues where mind is not involved).

It should be added that the content of the communication itself is that which is common to the states of sender and receiver. Thus, if the sender is a sunset and the receiver a human observer of it, the receiver will feel and think in ways not possible to the entities constituting the sender. The message, or content of the communication, is then to be understood as containing only the form common to sunset and observer, and not the concomitant feelings.

Vehicles. Turning next to the vehicles, their function is to embody and preserve in the process of transmission the essential form of the states constituting the message. This is strictly true only where the message actualizes a potential state in the receiver. In the case of confirmation or recall, the vehicle may take the form of a cue, which need not actually embody the form of the message but may by associa-

tion signalize it. Much communication between persons is of this variety. Language especially is the means whereby the sender confirms or recalls in the receiver states which have earlier been learned through direct presentation of the state-configuration. For example, the word "chair" may recall the perceptual state "form of chair" previously learned by communication of that form from chair to person in firsthand encounter.

There are many kinds of vehicles, such as physical contact, carriers (as in the communication of an infectious disease), written or spoken words or phrases (as presentational forms), verbal propositions (discursive forms), non-discursive verbal forms (for example, myths, poetic metaphors), gestures, facial expressions, rituals, dances, visual patterns either natural or artificial, music. Some of these vehicles are primarily cues, while others are largely form-carrying. Often the vehicle serves in both ways. Messages are limited not only to those states which are proper to both sender and receiver but also to those for which an adequate vehicle may be found. It cannot be assumed that every state can be fully and truly carried by some vehicle.

COROLLARY DEFINITIONS

Communication is in essence a social transaction, and the vehicles used in communication are usually organized systematically. These facts suggest the following definitions: The class of all senders and receivers having the same set of characteristic states, together with a corresponding set of vehicles, constitutes a community of communication. The vehicles constitute a universe of communication. When language is used, these may be called, respectively, a community of discourse and a universe of discourse. A set of such vehicles which have a particular symbolic character is said to form a symbolic system (for example, a language or a mathematical system).

FAILURES IN COMMUNICATION

In light of the above analysis, it would seem that there are three principal causes of failure in communication.

1. Communication will fail whenever the message, a characteristic state of the sender, is not a characteristic state of the intended receiver. Under these circumstances no conceivable vehicle could carry the message. There are persons who "have ears but do not hear and eyes but do not see." There are persons who are tone-deaf, color-blind, insensitive to beauty, spiritually shallow, intellectually limited. All men are not born equal in capacity for perception and understanding. The possibility of human communication is dependent upon personality structure. For certain simple kinds of messages the community of communication includes almost all persons. For more complex and subtle kinds, only some persons, perhaps even a very small number, are by nature and experience competent to participate.

The failure of communication may be only temporary if the message, though a proper state of the intended receiver, is not actual or latent but only potential. The task of the educator is twofold: first, to distinguish as far as possible which messages are characteristic states of each student and which are not, and second, so to choose message sequences (curriculum) and vehicles (methods) as to actualize most efficiently the potential states of each student. In other words, the educator's rule is: attempt to teach only what lies within the student's capacity and let the aim be maximum realization of personal potential.

2. Communication will fail whenever the vehicle is inadequate to carry the in-

tended message. A vehicle is in general a much simplified schematization of the very complex states which seek representation. The pattern of light which produces the visual image of an object is a very partial representation of the full inner reality of the object. No human being is ever able to communicate to another person his full experience. Everyone knows what it means to struggle in vain for words or bodily expressions to convey a meaning or a feeling. Most philosophic systems and some scientific theories give, at best, only a general idea of what their authors hope to express. Cultural progress is advanced by the discovery of vehicles which can fruitfully express an ever wider range of states. From this standpoint the attempt to encompass all experience within the limits of the literal discursive symbols of natural science represents cultural regress. A due modesty about the weight of traffic which our vehicles will bear is in order. The whole world of experience is much richer than the sum of our universes of communication.

3. Communication will fail whenever a vehicle is employed as a cue for an intended receiver whose previous experience has not made the state which the cue represents either actual or latent. For example, it would be meaningless to say "chair" to someone who had never heard the word in association either with a direct visual or tactile experience of a chair or with a chair-form-conveying message (for example, "A chair is an object for sitting purposes, usually with four vertical legs, supporting a horizontal seat, and providing some kind of back rest.") The cry is often heard, "Words, words, words —sound and fury, signifying nothing!" and the demand is made to "define your terms." This happens when symbols are employed as cues without adequate preparation of the intended receiver. The progressive education movement was partly in protest against this, in its demand for experience-centered learning in contrast to certain formal and verbalistic tendencies. In essence it was not a protest against symbolic learnings themselves but against education through *empty* symbols.

COMMUNICATION IN THE NATURAL SCIENCES

The enterprise of physical science consists of an attempt to create a special kind of community of communication, centered around a language representing specified measurement operations which reflect space-time-energy configurations of material things. The community of physical science discourse consists of the human beings for whom this metric order is reflected in a perceptual and conceptual order, and the symbolic system which serves as vehicle for these configurations. For example, the formula for a freely falling body in the earth's gravitational field, $S = \frac{1}{2}gt^2$, represents a space-time-event pattern which is shared by all persons who understand this equation, that is, those who by meter stick and stop watch, or otherwise, could verify it.

The point to be emphasized is that discourse in physical science is limited to certain carefully prescribed kinds of states of material bodies as reflected in human states of perception and conception. These limitations are such as to produce a relatively unified community of discourse in which the process of modification in experience and its symbolic expression take place in an orderly and cumulative fashion.

In the case of the science of *living* things the same general conclusions apply. However, it is by no means certain that the discourse in this field can be limited to the space-time-energy configu-

rations of physics if the characteristic states of living things, over and above their physical states, are to be adequately represented.

COMMUNICATION IN THE SCIENCES OF MAN

In the natural sciences the content of communication is limited to the human perception of states which are characteristic of nonliving things or the subhuman orders of living things. When man himself becomes the subject of discourse—as in anthropology, sociology, psychology, history, economics, and political science—the messages must consist of states which are specific to man. Here three main kinds of problems are presented. First, there is an effort to produce the same kind of unified and well-ordered community of discourse that characterizes the natural sciences. This results in the tendency to imitate the procedures of natural science and to employ the same space-time-energy categories that proved successful in creating the natural science community. The question is whether the outcome of such an attempt is significant discourse about man as man or merely about man as a physical and biological entity. It seems likely that while much may be learned from natural science methodology, the authentic and distinctive sciences of man must employ categories which represent the uniquely human states—those involving freedom, self-awareness, time-consciousness, and the like. Recognizing this, some social scientists and psychologists are now moving away from a slavish imitation of physics and biology and experimenting fruitfully with methods and concepts truly appropriate to man.

The second problem arises because of the personal qualifications which communication of specifically human states introduces. The meaning of moral responsibility, creative imagination, or sacrificial love, for example, can be understood only by persons of a high order of personal capacity and development. The qualifications for membership in the community of discourse about the physical world are also strict, but of narrower range than those required for understanding man. The implication is that a really competent social scientist or psychologist requires more than merely technical intellectual skill; he also needs moral insight, aesthetic sensitivity, and spiritual maturity. Without these attainments he cannot actualize states which embody essential messages about the nature of man.

The third problem hinges on the fact that man cannot be properly understood by the usual scientific mode of abstractive generalization, for a human being is essentially a unique, concrete, creative entity. Personal being is inescapably individual and particular. It follows that communication about persons will primarily involve states associated with what might be called intuitive insight rather than the logical clarity of ordinary scientific rationality.

COMMUNICATION IN THE HUMANITIES

Perhaps the scientific study of man is but an attempt to render more precise and reliable what has perennially been communicated in art and letters. Yet the humanities may be in some ways more trustworthy in their insights about man than the sciences, since the artist feels free to use any mode of discourse without the restraint imposed by the impressive methodological ideal of natural science. The function of the humanities is to express as fully as possible the inner and characteristic reality of the human spirit.

One feature of communication in the

humanities is the variety of vehicles which need to be employed. Examples are the myriad kinds of art forms—in music, painting, dance, poetry, drama, architecture, sculpture—the manifold interpretative schemes in philosophy, and the beliefs, myths, legends, and rites of religion. Such variety is required because of the complexities and contrasts in the possible concrete human states to be expressed.

It follows that, in comparison with the communities of communication in natural science, those in the arts, philosophy, and religion will tend to be more numerous, limited, and varied. For example, though there is essentially but one science of physics, there are many schools of philosophy, many religious faiths, and an endless variety in artistic expression.

Corresponding to this plurality there is the necessity of natural capacity and adequate preparation for participation in any given community of communication. Enjoyment of a certain kind of aesthetic appreciation, speculative insight, or religious faith presupposes certain native aptitudes and sensitivities and the requisite cultural learning. Furthermore, to some degree every chosen path of life excludes other possibilities, so that the ability to actualize certain states precludes the ability to actualize some others. To a degree, therefore, communication of the human spirit will always be for the initiated or elect or for "the inner circle." There is no inherent merit in exclusiveness, but there is inevitably an element of exclusiveness in any theory of communication which seeks to do justice to the richness and variety of the forms which characterize the human spirit.

CONCLUSION

One outcome of this analysis is a critical perspective on the idea of public or common knowledge. Our nation has demonstrated magnificently the possibility of uniting many diverse peoples into a single commonwealth. Equality has been and remains a great social ideal. Yet there are also great and historic ideals of individuality, freedom, and variety. In an age threatened by collectivism and pressure to conform, it seems especially imperative to defend and exalt these latter ideals. The foregoing philosophy of communication may serve that end. The possibility of communication rests ultimately on actual modes of being (characteristic states), and the universe is so constituted that there are in fact varieties and grades of being—in the human species partly as a function of native endowment and partly as a result of experience. Human communication involves the creation of mutuality of being, through the discovery and use of appropriate vehicles. The natural science communities (which are in their own way necessarily esoteric despite the coordinate truth about the "public" character of science) engage in one important kind of communication, but by no means the only or the "best" kind. In the fields of morals, art, philosophy, and religion there are modes which are perhaps even more significant, but predicated on a different kind of preparation and manifesting a different range of competences from those of the natural science communities. It is perhaps in the sciences of man that the problem of communication is today most acute, for here arises most sharply the tension between the kind of limitation and discipline imposed in creating natural science communities and the demands of richness, depth, variety, and human adequacy which determine the forms of significant humanistic communication.

Communication of Scientific Thought*

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In the communication of scientific thought, mathematics plays a dual role, for she is both queen and servant of the sciences. As the queen, mathematics is the highest form of logic created by the human mind, and this logic is exhibited both in a symbolic system of operational thought and in ordered structures of theories of numbers and of space (of quantities). As the servant, mathematics offers to the other sciences not only its logical system of organization but also *mathematical models* of the various areas of the several sciences. These models set up an isomorphism between mathematics and the elements and relations of the area of science to which it is applied, and it is the mathematics of the model that is used to communicate the scientific laws and hypotheses, as well as to carry on investigations in science in a search for new knowledge. Mathematics is the primary agent of communication of scientific ideas.

NATURE OF MATHEMATICS

Some of the characteristics of mathematics which give it its special force as a communicating agent have been discussed in an earlier issue of THE RECORD.[1] They are repeated here without illustration as orientation for the material that follows.

1. Mathematics deals with propositions —assertions and implications—which can be verified and on which any two rational persons can agree.

2. A given body of mathematics is independent of the mutations of time and space.

3. Mathematics is exact in all that it does, although it frequently deals with inexact (approximate) data.

4. Mathematics is deductive logic. It subjugates sensory experience to discrimination, to abstraction, to generalization and then strips the generalization of all physical significance, making the objects thus remaining creatures of abstract thought. The subjection of these generalizations and abstract entities (usually symbols) to purely deductive methods is to build a mathematical system.

SOME ROLES OF MATHEMATICS

How does the scientist come to know? And how do all scientists come to the same knowing? Through sensory experience and a chain of assertions. In mathematics we know what we know because

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[1] Howard F. Fehr, "Reorientation in Mathematics Education," *Teachers College Record*, Vol. 54 (May 1953), pp. 432-33.

of a chain of assertions, communicated one by one to the last link, which lies in a direct experience. We need not always go to the end of the chain, for frequently it is possible to arrive at an already validated assertion, one that has heretofore been traced back to direct experience. Science is an attempt to symbolize and to systematize the abstractions made from experience. In mathematics and physics, by the use of only a few symbols, a great amount of knowledge has been communicated exactly and much new knowledge has been predicted. The fact that scientists know, and that they recognize different structures of knowledge within a given domain, enables them to make choices of desired structures. The choice is a matter of individual values.

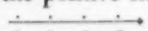
As a servant, mathematics is sometimes called applied mathematics. In this case, mathematics selects from its storehouse of operations and relations materials with which it builds a model of the observed scientific phenomena. Consider the case of a bomb dropped or discharged at a great height from the earth. The physicist studies the dropping of the bomb under various conditions. The first communication is, "The bomb gains speed as it drops." This is very inexact reporting, since the hearers may have not one but various concepts of how fast the bomb drops.

For a better description the physicist now sets up measuring devices that report the time and position of the bomb, and he places these measurements in a tabulation similar to the following:

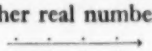
Falling of a Bomb

Time of fall in seconds	0	1	2	3	4	5
Distance fallen in feet	0	16	64	144	256	400

This is a much better description of the fall than that previously given, but it is certainly not in good form for further study. It is here that the mathematician steps into the picture. He identifies the times as points on the positive side of a real number axis:



He associates the distance, measured in feet, on another real number axis:



He then sets up a *function* in which time and distance are related. For a number representing a given time, he associates the number representing the corresponding distance. He thus obtains a set of number pairs:

$$(0, 0);\ (1, 16);\ (2, 64);\ (3, 144);\ (4, 256);\ (5, 400)$$

This set of number pairs is his function.

Next, the mathematician selects a formula he calls a functional relation. While he can choose many formulas, he perhaps chooses $s = 16t^2$ and associates this formula with the corresponding physical occurrence of the falling bomb. Now the mathematician goes beyond the physicist. He assumes that this functional relation holds for all values of s and t (distance and time) and not only those that were measured by the physicist. The mathematician says if t is 2.5 sec., then s will be 100 ft. This is checked by the physicist and found to be correct. Then the physicist discards his verbal language and replaces it with the symbolic function relation.

He does this because he recognizes the isomorphism that exists between the physical phenomena and the mathematical system. An isomorphism is a one-to-one correspondence between the elements and operations of one system and the elements and operation of another system. The table on the following page illustrates this isomorphism for the above example.

Thus there is within mathematics a certain system which is used as a model of

Physics	*Mathematics*
Time	one real variable, t†
Distance	a second real variable, s
Change in distance with time	a function relation, $s = 16t^2$
Rate of falling	the derivative of the function, $v = 32t$
Acceleration	the second derivative of the function, $a = 32$
Etc.	Etc.

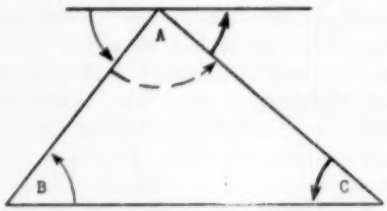
the physical structure under investigation. The mathematical system becomes the communicating agent of physical law.

The physicist, upon closer measurement—involving surface structure and the viscosity of the air, which cause decreased acceleration—and upon investigating the falling of bodies in other media such as water or molasses, will seek a more general law of falling bodies. Again the mathematician, through the use of differential equations will come up with a more complex functional relation involving a logarithm and hyperbola which might look like the formula

$$s = \frac{v^2}{g} \log_e \left(\cosh \frac{gt}{v} + \frac{u}{v} \sinh \frac{gt}{v} \right)$$

where the v, u, and g are determinable constants for given situations.

As queen, mathematics is a form of deductive reasoning, treating objects of thought devoid of all material significance. In mathematics we have the most nearly perfect type of communication that exists in the world today. Thus there is a pure number system of elements 0, 1, 2, 3, and so on. These symbols are related by certain fundamental laws and operations, some assumed, some undefined, others defined and derived by logical procedures. The symbols gain their meaning through the relationships established by the fundamental laws and no other way. These relationships are extended by implicative propositions of the type: If this . . . , then that . . . ; and If p implies q and q implies r, then p implies r.



A simple example of this type of communication is any theorem in plane geometry. For example, the sum of the angles of a plane triangle is two right angles is stated in the form: If the figure is a plane triangle, then the sum of its interior angles is two right angles. By angle, triangle, right, and two we mean nothing more than is implied in the logical use of these words. (Incidentally, no one has ever *seen* two, or a geometrical line, angle, triangle, perpendicular lines, or parallel lines. These are abstractions and cannot be physically sensed.) Measuring the angles of a million triangular shaped physical objects would never establish this theorem. But to say (1) There is only one line through vertex A parallel to the base; (2) The angles formed by this line and the sides of angle A are equal respectively to the other angles of the triangle; (3) The three angles at A form two right angles; hence (4) The interior angles of

† A real variable is a symbol replaceable by a particular real number, for example, 2, ½, π, $\sqrt{2}$, etc.

the triangle form two right angles, is to set up a chain of verifiable assertions which prove the theorem. This, and all that is implied, is mathematics as a deductive science.

ELEMENTS OF SCIENTIFIC COMMUNICATION

The elements involved in scientific communication as in most forms of communication are symbols (including words and signs), definitions, statements, and logic. A brief analysis of the role of each of these elements of communication is all that is possible within this article, but the treatment given is sufficient to acquaint the reader with their significance.

Thought and its communication are accomplished only by the use of symbols. Mathematics is thought. In order to communicate its thought it has devised its own complicated system of symbols. In mathematics, as in other discourse, we accept a symbol as anything cognized by one or more of the senses which may be used to convey meaning from one consciousness to another. Not all symbols are words. Not all signs are symbols. We distinguish between these various concepts.

The designation of difference between a sign and a symbol is necessary to distinguish between mere action and thought. Signs are evidence of the *existence* of something as lightning is the sign of thunder. On the other hand symbols (including words) provide no evidence of the existence of a thing. All animals react to signs. *Signs do not permit communication.* Thus in mathematics the signs $+$, $\times$, $\div$, $\int$, dy, Σ, and so on as signs are of little value, except for the behavior they elicit. As symbols, however, they permit thought, and the communication of thought. ***A symbol is the name of a concept in relation to other symbols that makes ordered reasoning possible.***

This is merely saying that the name (symbol) of an object is a word or collection of words which is used in statements to replace the object named. The *name* of the object is thus different from the object. It is the name that enables us to derive logical relations and build a theory of communication.

Since most of the symbols used are words, it is first necessary to investigate how these words get meaning. A combination of letters is an English word, if and only if, it is used or has been used with a specified meaning for the transmission of thought and if the people who use it are agreed that it is a word. These words have meaning as agreed upon by the majority of literate English-speaking people. This sounds very simple, but in reality it is a very complex situation. For correct communication, the meaning of a word should be unique in a given context. Hence, scientists resort to definitions so that a word may have a single meaning that invariably applies. Reaching this agreement is not a simple matter.

In the first place, most words have a multiplicity of meaning. The trouble this causes can easily be sensed by using a dictionary. Suppose you read or hear: "She is fair."[2] What this means is in doubt in your mind. So you consult a dictionary. The *Century Dictionary* gives the following definition:

> **Fair.** Beautiful, comely, pleasing in appearance, attractive, plausible, gentle, peaceful, civil, blonde, of light hue, free from blemish, spotless, clean, pure, clear, without irregularity, free from bias, impartial, equitable, honest, not taking undue advantage, that which may be legitimately pursued, passable, moderately satisfactory, free from grave ob-

[2] For a good treatment of the place of language in communication, the reader is referred to Chapter 2 of R. S. Kershner and L. R. Wilcox, *The Anatomy of Mathematics* (New York, The Ronald Press, 1950).

jections, average, likely, promising, not stormy, within boundaries.

You must be in considerable doubt as to whether she was beautiful, clean and impartial, or moderately satisfactory without irregularities, or simply an unobstructed blonde, free from grave objections, who may be legitimately pursued. Of course we must eliminate multiplicity of meaning, and in this the dictionary does not help. In science a word must have a unique meaning. It must be unambiguous.

There are two other reasons why the dictionary will fail in giving meaning to words. One is that the dictionary definition is couched in unfamiliar words, and continued use of the dictionary for meaning of the unfamiliar words gives continued unfamiliarity. The other is that the dictionary leads you in a circle. Suppose you are interested in the meaning of "macle." The dictionary says:

Macle. A chiastolite, a twin crystal
Now you look up
Chiastolite. A soft pure andolusite
Now you look up
Andolusite. A silicate of aluminum; a chiastolite

Do you feel frustrated? A meaning must be given in terms of words which are already known. A dictionary cannot do this because it attempts to define all words in terms of other words. Since for accurate and meaningful communication circularity must be avoided, there arises this important conclusion: *In science, some words cannot be defined.*

This does not mean that these undefined words do not have meaning. They gain meaning in the way they are used. Thus point, line, aggregate, current, and so forth are words used in science with meaning, but undefined. New symbols are then defined in terms of already defined symbols and/or undefined terms. Since the phrase that defines the new symbol can always be used in place of the symbol it defines, it is evident that definitions are not a necessity but merely a great convenience.

Before considering other elements of communication we examine the *purpose* of communication. There are various purposes and types of communication language ranging from the esthetic to common language, to legal language, to the scientific. Some aspects of this range are illustrated by the following newspaper items. The first is from the business section of a daily newspaper.

"The Lehman Corporation's net asset value reached $217,659,967 equal to $47.04 a share on March 31. This compared with $190,329,780 or $45.25 a share on fewer shares at the beginning of the quarter."[3] Is there any doubt in the minds of all who read this or hear this as to the meaning? Is there a conflict of interpretation in this communication? Most probably there is not. The statement is precise. The meaning in the mind of the writer is communicated exactly (reproduced with the same meaning) in the mind of the reader or auditor.

The second item is from the theater page of the same newspaper.

"But above and beyond the styles, Mr. Belafonte represents the fanaticism of the dedicated artist. Eliminating himself he concentrates on the songs with fiery intensity. Although his manners are simple, his singing personality is vibrant and magnetic. Mr. Belafonte never makes a mistake in taste or musicianship, for he is all artist, and a rousing performer."[4]

Is there a conflict of interpretation in your mind? Did you recapture exactly

[3] *New York Times*, Thursday, April 7, 1955, p. 45, col. 4.
[4] *Ibid.*, p. 23, col. 2.

the thought that was in the writer's mind? Is the statement precise? Is this piece of communication intended to give an exact impression of the artist's ability?

These contrasting descriptions are not cited to praise the one and condemn the other, but rather to bring out some different purposes of communication—one esthetic, the other factual. Language as a means of enjoyment, for esthetic purposes, is a means of action only as it leads the reader to build up scenes to be enjoyed by himself. There is no need for a one-to-one correspondence of meanings between author and reader.

In reading to get the *meaning* of the author, there is an intellectual instead of an esthetic purpose. In the communication of scientific thought, the intellectual purpose is the only one desired. We read a mathematics text or a description of nuclear physics to reinstate or re-create in our minds the exact thinking of the author. This is necessary to avoid confusion.

In general, mathematical communciations are made through declarative sentences, not by isolated words. If the sentence has the property of being either true or false, it is called a *statement*. Science is concerned with recognizing a statement and determining whether it is true or false. Both "statement" and "true or false" are used in a specific manner. A statement is recognized as a

$$\text{Noun and verb} + \begin{matrix}\text{Nothing}\\ \text{Another noun}\\ \text{Adjective}\end{matrix}$$

Thus, "The solution exists"; "The triangle is right-angled"; "geodesics are distances," and so on are statements that are either true or false. Truth and falsity in science, however, are quite different from the use of these words in other areas of discourse, and in this difference lies their real importance in communication. In science, if a man says, "This specimen is gold," you can verify that the statement is true or false. If a man says, "I like this assignment of talking today," you either accept or reject the statement, but you will find it difficult to determine whether it is true or false. Generally it is difficult to determine whether a statement is true or false. In religions and in ethics a different interpretation is placed upon truth and falsity. Here, in general, certain dicta are handed down as absolute *truths*, dicta that are true forever. The contradictory of these statements are absolutely false, false forever.

In science, truth and falsity are relative values. Initial statements are merely accepted or rejected. Science studies the relationship of these statements if accepted as true, or if accepted as false, and determines by purely deductive methods whether the relationship also is true or false. It is in this sense that all science is relative and that absolutes do not exist. Truth is logical consistency; falsity is logical inconsistency. All relationships communicated in mathematics and science are accepted or rejected and understood in this light.

Scientific communication is logical communication. Every scientific theory is a system of sentences which are accepted as true and which may be called laws, or asserted statements, or simply statements. In mathematics these statements follow one another (are related to one another) in a definite order, following definite, agreed-upon considerations. Thus, there are:

1. Primitive terms or undefined terms.
2. Definitions. Statements using primitives to derive new terms.
3. Primitive statements or axioms which are asserted as true.
4. Proved statements, derived from 1, 2, and 3 by

5. A deductive logic. The logic is presupposed as already developed or developed simultaneously with the scientifiic communication.

USE OF SYMBOLIC LOGIC

Everyday language often uses logical methods. It contains variables (such as men, weights, wealth) and quantifiers (such as some, any, all). However, the everyday expression is phrased differently when used in scientific language. In everyday language we say, for example,

all men are mortal
some men are wise

In science these same statements are expressed in the form

For any x, if x is a man, then x is mortal
There is an x, such that x is both a man and wise

The reason for such manner of statement is to avoid ambiguity of communication and to allow tests for truth and falseness of the statements.

An extended treatment of the sentential calculus (the basic language of communicating in all areas of mathematics) is not possible in the space of this article. Here only a few fundamental elements of such communication are treated, with an illustrative example of each. The first concept is that of negation or *denial.* If we are to test the truth of a statement, we need its contradictory. We get this through the use of the word *not.* In everyday language or in scientific language we say, "2 is a postive integer." In everyday language we get the contradictory by saying, "2 is not a positive integer."In scientific language, however, this contradictory is written: "It is not the case, 2 is a positive integer"; or simply, "not 2 is a positive integer." The reason for this is evident when logical symbols are used. In the logic of science an entire statement is represented by a letter, for example, the sentence "p." In the use of everyday language, for the contradictory it is necessary to have a new statement which must be represented by a new symbol. But in scientific communication the symbol $\sim$ is used to denote the contradictory or negative, and the statement "$\sim p$" is the contradictory of the statement "p." No matter what statement is made in science, be it true or false in the logical sense, it can be denoted by "p" (or "q" or "r" or any convenient symbol), and its denial is then "$\sim p$."

The next important concept is *conjunction* or logical product. This is merely the joining of two statements by the word "and." Each statement is a member or logical factor of the product. For example, from the two statements,

"2 is a positive integer"
"2 is less than 3"

the logical product
"2 is a positive integer and 2 is less than 3" is formed.

In communication theory a symbol is invented for this meaning of "and"—this logical conjunction. One common symbol is &. Another is ∧. Then any conjunction can be written in the form "p & q."

The important property in communication is to determine when a *conjunction* is true or false. Let's look at this statement, "New York is a small town and F. D. Roosevelt was a citizen of New York." Is this speaking truth or falsity? In science a conjunction cannot be taken as partly true or partly false. The "and" (&) means both . . . and, if either statement is false, the whole conjunction is false. A table of truth values for conjunctions would appear as follows:

p	q	$p \,\&\, q$
T	T	T
T	F	F
F	T	F
F	F	F

Thus, "Mr. A eats his hat and the world is flat" is a false conjunction, and so is "Mr. A loves his wife and the world is flat," even though in each case it may be impossible to determine the truth or falsity of the first statement.

The third important concept is "disjunction," "logical sum," or "alternation." This is the joining of two statements by the word "or." Each statement is a member of the disjunction or a summand of the logical sum. In everyday language the word "or" possesses two different meanings: (*a*) nonexclusive, as in "Teachers or students receive a discount," and (*b*) exclusive, as in "We shall go on a hike or we shall go to the theater." These two uses frequently cause trouble in communication. In scientific communication, however, only the nonexclusive meaning is permitted. An *alternation* is true if at least one of the statements is true. The truth table would appear as follows, where "$\vee$" is the symbol for alternation:

p	q	$p \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

It might be well to use the word "or" in this same sense in everyday language and insist on the use of "either—or" if the exclusive sense is meant. Thus, in scientific communication, the alternation

$2 \cdot 2 = 5$ or New York is a large city is True;
$2 \cdot 2 = 4$ or New York is a small town is True; but
$2 \cdot 2 = 5$ or New York is a small town is False.

Accepting an alternation as true can be an admission that we do not know which statement is true. For example, the alternation of a personal friend, "I am leaving town today or I am leaving town tomorrow," is a true statement, even though the friend knows he is leaving town today.

A fourth concept, perhaps the most basic in communicating scientific theory is that of implication or *conditional*. This is the combining of two statements by preceding them with "if" and "then" respectively. Such a combination is called an implication or a conditional sentence. The "if" statement is called the *antecedent* or hypothesis, the "then" statement is called the *consequent* or conclusion. In science, only material conditionals are used; that is, no formal connection or relationship between the hypothesis and the conclusion is required. Thus, "If it rains Tuesday, then Russia is a Communistic country" is accepted as a conditional, and its truth or falsity rests solely on the truth or falsity of the parts of the implication. The symbol for conditional is $\rightarrow$ and the symbol $p \rightarrow q$ is read "if p, then q." Since every meaningful implication (one in which there is a direct relationship between hypothesis and conclusion) is also a material implication (but not vice versa), only material implications need to be considered in arriving at truth or falsity of conditionals. The truth table for conditional is:

p	q	$p \rightarrow q$
T	T	T
(T	F	F)
F	T	T
F	F	T

Thus, "If $x^2 = 25$, then parallel lines meet" is false because the conclusion is false. Similarly the statement "If the moon is made of gold, then the earth is flat" is a true conditional because both antecedent and consequent are false. This conditional could be written in the equiv-

alent form "If the earth is not flat, then the moon is not made of gold," which is a true conditional since both antecedent and consequent are true.

The last concept to be mentioned is the *biconditional*. This is expressed by the symbol $\longleftrightarrow$ and consists in joining two statements by the expression "If and only if." Thus the statement "A man is happy if and only if he is playing," is a biconditional and can be considered as a union of two conditionals into a single sentence. The biconditional given is equivalent to the two conditionals: "If a man is playing, then he is happy" and "If a man is happy, then he is playing." The expression "necessary and sufficient conditions" is also used for "if and only if." The truth table for the biconditional is as follows:

p	q	$p \longleftrightarrow q$
T	T	T
T	F	F
F	T	F
F	F	T

Thus, a biconditional is true "if and only if" both its statements have the same value, that is, both are true or both are false. The biconditional "A submarine flies in the air if and only if Thanksgiving is on a Sunday" is true, since both statements are false.

To bring all five of these components of communication into focus, consider the following pronouncement:

"If either the teachers *or* the administrators are inefficient, *then* education of children goes forward *if and only if* the parents are informed *and not* socially passive."

This involved statement has the following component statements and connective symbols:

a: the teachers are inefficient	if—then: $\rightarrow$
b: the administrators are inefficient	or: $\vee$
c: education of children goes forward	if and only if: $\longleftrightarrow$
d: the parents are informed	and: $\&$
e: the parents are socially passive	not: $\sim$

Rewritten in complete symbolic form the pronouncement becomes:

$$a \vee b \rightarrow [c \leftrightarrow (d \,\&\, \sim e)]$$

This symbolic form is neat, compact, inclusive, and permits no misunderstanding.

Of course this not all there is to the theory of communication. But the foregoing symbolic statement, devoid of all emotional content, permits the exact communication of thought.

The esthetics of all this is well expressed in the following poem.

PARADOX[5]

Not truth, nor certainty. These I forswore
In my novitiate, as young men called
To holy orders must abjure the world.
"If . . . , then . . . ," this only I assert;
And my successes are but pretty chains
Linking twin doubts, for it is vain to ask
If what I postulate be justified,
Or what I prove possess the stamp of fact.

Yet bridges stand, and men no longer crawl
In two dimensions. And such triumphs stem
In no small measure from the power this game,
Played with the thrice-attenuated shades
Of things, has over their originals.
How frail the wand, but how profound the spell!

CLARENCE R. WYLIE, JR.

[5] *Scientific Monthly*, Vol. 67, No. 1, July 1948.

Studying Effects of Mass Communication*

An Introduction to the Field as Viewed and Tilled by the Behavioral Sciences

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Sociologists, psychologists, and workers in other behavioral sciences have long been interested in mass communication. It is altogether logical that they should be, for mass communication is a reflection of human behavior and an allegedly potent influence upon it.

Approaches to the study of mass communication taken by the several disciplines have been in some ways dissimilar, but have perhaps in more instances overlapped. In practice, communication research has become a field in its own right, tilled in common by workers in various social sciences.

The focuses of professional communication research have in large degree reflected the focuses of popular interest. For second only to its interest in using the media, is the lay public's concern with the alleged or potential effects of these media. Teachers and preachers, legislators and jurists, politicians and just plain parents have been concerned, for example, with what comic books may be doing to juvenile morals, with what advertisers may be doing to buying habits, and with what propagandists—good and bad, overt and covert, foreign and domestic—may be doing to the minds of men.

Communication researchers have been similarly, though not exclusively, concerned with the effects of mass communication upon public attitudes and behavior. But they are inclined to regard the process of effect as highly complex and not easily predictable. The lay public, for example (and from this point of view many educators must be numbered among the laity), is inclined to view communication effects as stemming almost exclusively from the content of the communication. Communication researchers, in contrast, see content as but one of many elements in the process, and they have, at least theoretically, set themselves the task of identifying the other elements and assaying their several roles.

This discussion will cite one way in which communication researchers have tried to formulate the process of effect. It will single out several elements in the formula, noting how each contributes importantly to effect, and it will point also to major omissions. In sum, therefore, it will indicate the complexity of the process, and the growing but not yet wholly

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adequate techniques with which applied social research seeks to study it.

THE "LASSWELL FORMULA"

Communication research has been traditionally—and until recently almost exclusively—defined as "the study of WHO says WHAT to WHOM with what EFFECTS." The formulation derives from Professor Harold Lasswell, a student of jurisprudence and political science and a pioneer in communication research.

For some years the "Lasswell formula" was typically interpreted as delineating several discrete fields of study. In one sense this interpretation was both valid and healthy, for it focused attention upon aspects of mass communication other than their effects. Studies of WHO says—that is, of media control—contributed to knowledge of the power structure of society, and analyses of WHAT—that is, of media content—illuminated social value patterns. But the "Lasswell formula" may also have functioned as a strait jacket. In suggesting the existence of discrete aspects of communication, the formula may have retarded the realization and study of their mutual influence and interplay. Communication content, for example, is clearly not an independent phenomenon, but a product of many influences, among them the nature of media control (compare, for example, the media fare in a totalitarian state and in a democracy). And effects, the last element in the formula, are today regarded as the product of a particularly complex interplay of all the other elements in the formula, of several newly identified elements, and doubtless of other elements as yet unknown.

This discussion cannot hope to review the breadth of existing knowledge or to list all the questions as yet unanswered. By way of compromise, we will note how the WHO, the WHAT, and the WHOM—affect effect. We will demonstrate that their influence does not work in a unidimensional way, but through complex and devious feed-backs. We will note a few other influences, uncited in the formula. And though we provide, even then, no exhaustive description of the process of effect, we may hope to sketch the basis of the communication researcher's point of view, which is faith in an unending but progressively more fruitful search.

CONTENT AND CONTENT ANALYSIS

The fact that the content of communications influences their effects is beyond the need of proof, but we shall demonstrate it anyway as a prelude to demonstrating the influence of other factors. To take a homey example, an announcement over radio station WXYZ that the weather is expected to become twenty degrees cooler overnight may lead the listening housewife to check her supply of fuel oil or start getting out the storm windows. An announcement by the same announcer over the same station that the local grade school will be closed the next day because of snow-blocked roads will elicit from the same housewife a totally different reaction: she may, for example, be reminded of previous days with housebound children and sigh unhappily in anticipation of the morrow.

Taken together, these two everyday communication situations approximate a scientific experiment in which all elements but one are kept constant. The communicator and the audience (the WHO and the WHOM) are identical; only the content has changed, and the differing content has produced differing effects. Content, then, can safely be regarded as an influence upon effect. As such it becomes for the communication researcher an object of intensive study, of "analysis."

The term "content analysis" has been used to cover a multitude of procedures, ranging from sheer impressionistic discussion to rigidly objective techniques. The more objective and the more quantitative procedures generally involve two major steps: (1) defining those specific aspects of content which are presumably relevant to the topic under investigation; and (2) determining the incidence of these characteristics in the content at hand. A now classic analysis of daytime radio serials,[1] for example, revealed, among other things, that no unskilled laborers or factory workers ever played important roles in the stories; that the disproportionately large number of wealthy characters typically admired or envied middle class people; and that most of the gigantic problems continually besetting the characters derived from personal relationships and only 15 per cent derived from impersonal forces such as war or business conditions.

Such precise and objective descriptions of communication content help the researcher identify the kinds of effects which may be expected, and the specific aspects of content which might produce them. On the basis of the analysis described, for example, the researcher might suspect that daytime serials increase the self-esteem of middle-class housewives, inhibit their envy of the wealthy, and divert attention from real social problems.

Such suspicions are, however, only hypotheses, and on the basis of content analysis alone the researcher can go no further. By itself content analysis can demonstrate neither the occurrence nor the process of effect. It can only suggest hypotheses—which may, of course, be tested by experimentation—for it deals only with content, which, we are at pains to demonstrate, is but one element in the complex dynamic of effect.

[1] Rudolf Arnheim, "The World of the Daytime Serial," in P. F. Lazarsfeld and F. Stanton (eds.), *Radio Research, 1942-1943* (New York, Duell, Sloan and Pierce, 1944).

THE AUDIENCE AND AUDIENCE STUDY

The effects of a communication upon its audience are in large part determined by two different aspects of the audience itself: its size, and the socio-psychological characteristics of its members.

Audience size is not so much a determinant of the nature of effect, as of its social width—not of *how* the communication affects individual audience members, but rather of the number so affected and the resulting social consequences. If, for example, Voice of America and Radio Free Europe broadcasts affect the political views of, say, 15 per cent of their hearers, the effect of the broadcasts upon a particular society will obviously differ greatly if the hearers number a hundred people or ten million. The parallel of the controlled experiment is here again roughly applicable: source and content remain unchanged; only audience size varies, and with it the social width of the effect.[2] The measurement of audience size is thus a matter of interest to communication researchers. It seems hardly necessary to add that it is a matter of equal interest to advertisers, international broadcasters, and other communicators who seek to elicit a broad social response.

Audience size can often be measured by relatively routine polling techniques.

[2] The hypothetical situation here presented is, of course, greatly oversimplified. Under normal living conditions, for example, the effects of audience-size differences would be complicated by word-of-mouth dissemination of the content of the communication. Furthermore, extreme differences in audience size may have a qualitative as well as a quantitative influence on communication effect; people are, for example, more ready to agree with the views of a speaker who is widely admired and attended than they are to agree with one who is relatively unknown.

A representative sample of the population in question is selected, members of the sample are asked whether they have read the particular magazine or, as the case may be, seen the particular film or TV program, and the percentage which has is "generalized" to the population which the sample represents.

Somewhat more ingenious techniques are required in cases where the respondents are, for one reason or another, inclined to be untruthful. Certain magazines of the "true confession" type, for example, enjoy a gigantic newsstand sale, but, despite pollsters' assurances of anonymity, few people will admit to purchasing them. The same respondents, however, may eagerly assert unlikely loyalties to *Harper's* or *The Atlantic Monthly*. In such cases the communication researcher is required to outwit his respondents, and various techniques have been developed to this end. Rewording of the question is often sufficient: respondents unwilling to admit buying a "low-class" magazine may readily confess to having read it "at home or perhaps in a beauty shop." "Portfolio procedures," in which respondents are shown and asked about articles whose source is not designated, have likewise been used to good effect. In sum, a little ingenuity usually suffices, and audience size is usually determinable with reasonable accuracy.[8]

[8] Ingenuity has, however, proved inadequate to the task of determining, with any precision, the size of audiences among wholly inaccessible populations. No poll, for example, can be made in countries behind the iron curtain to determine precisely how many persons listen to the Voice of America. In such instances, researchers are reduced to juggling the estimates made by refugees or observers, and tempering these by various inferential procedures. Regarding the potentialities and shortcomings of these techniques, see Joseph T. Klapper and Leo Lowenthal, "The Contributions of Opinion Research to the Evaluations of Psychological Warfare," *Public Opinion Quarterly*, XV, 4 (Winter, 1951).

Characteristics of audience members. In turning now to the role of the socio-psychological characteristics of audience members, we are again directing our attention to determinants of the *nature* of effect, rather than to its social width. The influence of such characteristics can, again, be observed in an everyday situation which approximates experimental conditions. Let us suppose that a radio station presents a program on civil defense which emphasizes the manner of constructing and stocking an air-raid shelter. And let us look at six fictional but wholly likely listeners.

Mrs. A, a rural housewife given to firm and independent action, may be greatly impressed with the radio program, order the suggested groceries, and demand of her husband, come evening, that he immediately set about constructing the shelter. Her next-door neighbor, Mrs. B, may feel that the whole matter falls outside the bailiwick of "woman's work," and may do nothing whatever in the belief that the whole thing will be taken care of by her husband. Her seven-year-old son, however, may find the whole idea pleasantly exciting and may eagerly inquire of Mama whether they are going to move to the cellar-room soon; or, on the other hand, he may find the whole thing extremely boring and go to his own room to listen to a space serial on his own radio. Meanwhile, in a nearby metropolis, Mr. C, who lives in a twenty-two story apartment house, may be as concerned as Mrs. A, but seeing no way in which he can construct a bomb-shelter, may merely mutter at the uncertainties of life in a tension-ridden world. Dr. D, a physician and the block warden, may learn nothing new from the program, but may become exasperated at the inadequate discussion of food contamination. And young Mr. E, a Communist, may

feel that the entire program is "warmongering propaganda," and may thus intensify his hatred of "imperialist ruling circles."

In brief, the *same communication* from the *same source* has produced six different effects among our sample of six listeners, and in each case the effect derived from certain socio-psychological characteristics of the audience members themselves: from such factors, in these cases, as sex and concepts of sex roles (Mrs. A and Mrs. B); age (young B); residence (Mr. C, as compared with Mrs. A and Mrs. B); occupation (Dr. D); and political orientation (Mr. E).

Similarly varied reactions, deriving from socio-psychological characteristics of audience members, occur in regard to virtually all communications. The number of such characteristics which may influence or determine communication effects is virtually endless. In general, they become operative insofar as they are attitude-related, and insofar as these attitudes are pertinent to the communication or its possible effect.[4]

Such pre-existing attitude patterns of audience members influence, and at times determine, whether they see or hear the communication at all, whether they pay it passing or careful attention, and how they react to it. Deeply ingrained or ego-involved attitudes may even affect the meaning which the viewer or listener attributes to the communication itself. Our Communistic Mr. E provides an excellent example: what others perceived as well-intentioned instruction he perceived as distasteful and heinous propaganda, and he reacted accordingly.

The case of Mr. E is, in fact, particularly significant, for it demonstrates that the elements of the "Lasswell formula" do not necessarily work in a simple unidirectional way. Here is no simple situation of successive influences, in which the speaker or author (WHO) determines the content (WHAT) which then elicits from the audience (WHOM) a particular response (EFFECT). Rather, a complicated feed-back situation seems to exist, in which audience attitudes redefine the content, which in turn acts as a stimulus upon the same audience. In fact, feed-back of one or another kind exists between every two elements of the formula, and the formula itself in no way exhausts all the elements at work.

Audience attitudes, however, are assuredly one of the more crucial elements. And as such they must be investigated by the communication researcher who hopes to predict or to explain the effects of particular communications.

Since virtually any audience attitude may influence the effect of a particular communication, the researcher attempting to identify and assay such attitudes would appear to be faced with an endless task. In general, however, communication researchers are concerned with group tendencies rather than with individual reactions. And audience attitudes, happily, tend to possess some social prevalence. One or another of four or five different attitudes toward desegregation, for example, is likely to be held by the vast majority of a group of, say, white Southern grade-school teachers,[5] and identifi-

[4] Audience characteristics which are not necessarily attitude-related may, of course, also influence the processes of effect, and that in extremely basic ways. A person's residence, income, physical condition, or level of intelligence may determine whether he is accessible to particular communications, capable of understanding them, or capable of acting in the suggested ways. The role of such factors seems too obvious, however, to warrant further discussion.

[5] Specific attitude and behavior patterns are frequently found to be characteristic of particular socioeconomic groups. Communication researchers accordingly usually inquire into the socioeconomic composition of the audience;

cation of these particular attitudes is therefore likely to go a long way toward explaining the effects of specific communications on such a group. Communication research is thus generally able to identify much, but never all, of the mass of audience predispositions which may influence communication effects.

A variety of techniques, most of them laborious, are employed to this end. Obviously relevant attitudes can often be inquired into directly, again by polling or questionnaire techniques. Researchers attempting to ascertain the effects of domestic political broadcasts, for example, would probably ask listeners both direct and indirect questions about their past and present political allegiances, their views about current issues, and the like. Less obvious attitudes are often discovered by program tests and depth interviews. In program tests the communication itself is presented to test audiences, who are thereafter interviewed regarding their reactions and the bases of those reactions. Carefully formulated probing questions are employed to help the respondent verbalize grounds of reaction of which he may be only semiconscious. Projective tests and other quasi-psychoanalytic techniques are sometimes used to discover more deeply buried attitudes and predispositions.

All such procedures are toilsome. Their yield is often low, and to produce definitive data they must frequently be still more toilsomely combined. A series of projective tests, for example, may provide only a few hunches or hypotheses, which must thereafter be validated, or perhaps overthrown, by specially designed program tests. Happily, much of the knowledge so laboriously won can be stockpiled. Data on typical age and sex differences, for example, or on prevalent attitudes toward specific issues, slowly accumulate and provide information or clues for subsequent researches.

SOURCE AND SOURCE ANALYSIS

Relatively little need here be said about the role of the source, the WHO, in determining the effect of communication. For as important as this element may be, it functions in much the same way as do the elements which have already been discussed.

Situations which approximate experimental conditions and which attest the influence of the source abound both in the literature of research[8] and in daily life. Satellite radio audiences, for example, frequently disbelieved the Korean war communiques which they heard over their own stations, even when these reports happened to be true. The same audiences, however, accepted unquestioningly the same communiques broadcast by BBC or the Voice of America. Here at home, commercials delivered by particular media performers, such as Arthur Godfrey and Kate Smith, are typically more widely effective than are the same messages spoken by unknown performers or announcers.

The dynamics of this process are hardly mysterious. One who is thought to be a liar is assumed to be telling lies, or at least to be suspect, while trusted friends are trusted, at least until they prove themselves unworthy. The significant point for the communication researcher, how-

that is, the way in which the audience is distributed as regards age, sex, occupation, income level, education level, and the like. Such data are easily obtained by routine polling or questionnaire techniques, and are often accumulated in the course of audience-size studies.

[8] See, for example, the series of studies performed by Hovland and his associates and reported in Carl Hovland, Irving Janis, and Harold Kelley, *Communication and Persuasion* (New Haven, Yale University Press, 1954).

ever, is that the effect actually derives neither from the content nor from the source per se, but rather *from the image of the source which prevails among the audience*. The audience members invest the source with a particular aura—honesty, dishonesty, kindliness, slyness, or whatever. The aura influences the manner in which they interpret the content, and, of course, the effect which it has upon them. And thus the process of communication effect is revealed as even more widely multidimensional, and the feedbacks as more complex.

To communication researchers attempting to explain or predict effects, the source per se is a matter of relatively little importance. Having satisfied themselves that the source possesses no truly intrinsic peculiarities—that the announcer, for example, does not have a speech defect—they turn their attention to the more important question of *audience predispositions regarding the source*. Such predispositions are ascertained in more or less the same ways as those which have already been discussed.

ADDITIONAL INFLUENCES UPON EFFECT

A host of other elements, uncited by the "Lasswell formula," have been found to influence the process of communication effect. In regard to most of these elements research is in a very early stage.

The situation in which the communication is received, for example, has recently been attracting some overdue research attention. An extreme isolationist, confronted with a communication detailing the glories of the UN, may react in one way when among close friends with similar views, in another way when alone among persons of opposite views, and in still another when in a test situation and thus, as it were, accountable to an interviewer. Recent research suggests that these differences extend below the superficial level of overt response, and that the man actually thinks somewhat differently under these several conditions. Various other aspects of the communication situation also seem to influence the ultimate effect. To date, however, very little research has been directed to the matter.[7] Even the concept of "communication situation" remains as yet extremely hazy.

Factors totally external to the communication process per se are also known to influence the results of that process. One such element is the facility or difficulty of performing the suggested behavior,[8] or, in somewhat more technical terms, the effort required to relieve the tensions evoked by the communication. A media appeal to get out and vote, for example, may bring a citizen of Boston to the polls, while reinforcing the apathy or bitterness of a Negro in a poll-tax state.

We cannot here cite all of the elements, unmentioned in the "Lasswell formula," which have been found to play a role in the process of effect. Nor would any list compiled today remain complete after tomorrow's research. The "Lasswell formula," like any good but early map, may well have benefited its users most by inspiring them to explorations beyond its confines.

IDENTIFICATION OF EFFECTS

We come now to the last element of the "Lasswell formula," and the logical

[7] For a relatively early statement on the possible importance of the situation, see Eunice Cooper and Marie Jahoda, "The Evasion of Propaganda," *Journal of Psychology*, 23 (1947). The influence of several aspects of the situation, particularly "the saliency of group norms" has been more recently discussed in Hovland, Janis, and Kelly, *op. cit.*

[8] For a more extended discussion of this point, see G. D. Wiebe, "Merchandising Commodities and Citizenship on Television," *Public Opinion Quarterly*, XV, 4 (Winter, 1951).

end of the road we have set ourselves. We have discussed at some length the factors which influence the effects of communication, and the ways in which such influences are studied. We have now to consider the ways in which the effects themselves are identified.

There is perhaps no task with which communication research is more frequently concerned. The interested public, including both the paying clients of research and the gratuitously curious, are more interested in the results of communication—particularly mass communication—than in the details of how such results came to be. And the researchers themselves, who necessarily pursue a livelihood as well as basic knowledge, are concerned with determining effects both for the knowledge of the effects themselves and for the light which such knowledge throws upon the entire communication process which the researchers seek to clarify.

The techniques which have been developed for determining the effects of communication are legion. Happily for our purpose of brief review—if perhaps unhappily for the growth of our science—many are variants on the same basic theme. They attempt, in one way or another, to ascertain the differences in knowledge, attitudes, or behavior, between people who have been exposed to the communication and people who have not, and to relate such differences to the experience of receiving the communication.

The most puristic of such techniques is the controlled experiment pursued under formal laboratory conditions. Subjects are typically divided into two groups, matched in regard to major socioeconomic variables, and often in regard to attitudes or behavior which the communication is expected to affect. One of the groups is exposed to the communication and the other is not. Various tests and observational techniques are then employed to discover whether any changes in attitudes or behavior have occurred among the exposed group but not among the unexposed group. Since the groups and their experiences were kept similar except for exposure to the communication, any changes which occurred only among the exposed group can be fairly attributed to the communication experience itself.[9]

But such laboratory experiments, while methodologically pure, deal with very different conditions from those which obtain among people listening to or viewing mass media of communication. Laboratory subjects constitute a captive audience who are, or can be, motivated to view or listen to the communication, and who can be guarded, for the duration of the experiment, from exposure to similar or opposing communications. The mass media audience, in contrast, may pay the communication earnest or casual attention; they may join the audience after the communication has begun and leave before it has ended; they may be exposed to any number of other communications on the same topic; and those who did not hear or see the communication itself may nevertheless be indirectly exposed through the oral reports of friends. The researcher faced with determining the effects of a radio or TV series, a movie,

[9] Effects of specific aspects of the communication experience, such as particular types of content, attribution to particular types of sources, and so forth, can be similarly tested by exposing one group to a communication containing the element in question and exposing the other group to a communication lacking that element. In the hands of a skillful researcher, the controlled experiment can be developed into more complex forms, in which several groups are employed and the effects of several or compounded factors are explored.

or a magazine article is thus up against a situation at once more complex and less controllable than that which obtains in the laboratory.

He is likely, however, to work toward the same general sort of group comparison. He may, for example, use subscription lists, polling techniques, and other devices to identify a group of people who have been exposed to the communication in question, and then compare their knowledge, attitudes or behavior with those of a similarly identified group who have not been so exposed.

But here the researcher runs up against a problem not found in the laboratory. Not being armed, as is his laboratory colleague, with information on his respondents' attitudes *before* exposure to the communication, he cannot immediately tell whether the observed differences are the results of exposure or the exposure is the result of the observed differences. The researchers who found, for example, that Voice of America listeners in Western Europe were more pro-American than non-listeners were immediately faced with the problem of determining whether the listeners became pro-American as a result of hearing the broadcasts, or became listeners because they were pro-American to begin with.

Various techniques have been developed to help the researcher disentangle cause and effect. Occasionally, when time and the specific research task permit, the handicap of *a posteriori* investigation can be eliminated completely: the attitudes of an entire community, or of a representative sample thereof, can be surveyed *before* the communication is released and *re-surveyed* afterward. At times it may be possible to release a communication in one community and later to compare the attitudes in that community with those in a comparable community which has not been exposed to the communication. More often than not, however, the research budget or the specific research task precludes such comparisons over a period of time or between communities. In such cases, program tests, interviews, case histories, and similar devices may be employed to identify possible effects and to trace their relation to the communication in question.

Through such techniques and the data they provide, the researcher is often able to identify the effects of particular communications, or to determine that an expected effect did or did not occur. And if, as sometimes happens, the data prove inadequate for establishing any causal relationship, they may at least provide a hunch, which may be formulated as a hypothesis and tested by further specially designed research.

In any case, the demonstration that some effect has occurred is generally a prelude to an inquiry into its causes. The process may perhaps be easily laid bare and found to conform to known principles, formulated in earlier studies. Or the process may resist explanation, in which case basic research begins anew. The WHO, the WHAT, the WHOM, and the interplay between them are re-examined, and the whole communication situation is reanalyzed in the quest for unknown or misunderstood influences upon effects. From such puzzles are born new hypotheses and new techniques, to mature and to become fruitful in later researches.

Thus communication research slowly improves its tools and stockpiles its findings. And while its amassed knowledge is considerably greater today than it was twenty years ago, the vistas yet to be explored loom even larger. If the spirit of communication research remains vigorous, the same conditions will still hold true twenty years from today.

A Historical Approach to the Media*

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IT WOULD be possible to develop an elaborate theory of the various media of communication in Darwinian terms of natural selection. The media can be viewed as artificial extensions of our sensory existence—each medium an externalized species, as it were, of the inner genus sensation. The cultural environment created by the externalization of the modes of sensation now favors the predominance of one sense or another, and these species struggle through various mutations in a desperate attempt at adaptation and survival.

CULTURAL CHANGE AND MEDIA CHANGE

Many material accidents in turn foster an extremely uneven rate of development of communication facilities. The circumstances which foster painting, sculpture, or music in one age may produce a bulwark against the effects of, say, printing. But the same bulwark may be quite useless before the impact of movies or TV. North American culture and politics are especially dependent on print, because the printing press was the only form of European culture that could be exported in the seventeenth century. The very factors which made for a cultural monopoly of print in North America favored the full development of mass production. The book which at first encouraged the solitary individual came from a press which was based on a principal of mass production. Eventually the mass production principle of an assembly line of movable type spread into the whole technology of North America. But, tied to our original book culture, we have proved slow in adapting to technological developments. As our original book technology has been succeeded by movie and television we have lost book literacy without acquiring visual literacy. So now the principle of natural selection unexpectedly favors the Chinese and Japanese, for example; their pictorial mode of writing, once a great disadvantage in relation to the abstract culture of print, now favors them in a world of visual communication.

Improvements in the means of communication are usually based on a shift from one sense to another and this involves a rapid refocusing of all previous experience. It is, therefore, a simple maxim of communication study that any change in the means of communication will produce a chain of revolutionary consequences at every level of culture and politics. And because of the complexity of the components in this process, prediction and control are not possible.

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Another consequence of media change is failure in understanding between periods of the same culture, or within the same generation, as today. But just as unexpectedly a remote period of culture may suddenly develop a congeniality for a later period. For example, John Donne and George Herbert were engaged in transferring to the new printed page of the seventeenth century many of the effects which had previously been popular in the pictorial world of the later Middle Ages. For them print had made the visual arts recessive and quaint. In this century, while the vogue for metaphysical poetry has come and gone, the sudden predominance of the graphic arts has made print recessive. So a parallel but reverse combination of visual media corresponded for a few years between the seventeenth and twentieth centuries.

Since the turn of the century we have begun systematically to filter one past culture through the screen of others and of our own—a game in which we can play with whole cultures and epochs as easily as we could previously combine phrases from two languages.

EFFECTS OF NEWER MEDIA

Writing on the role of psychiatry, Karl Stern, for example, notes:

> In the mass of the population as a whole it would seem that "oral instability" were steadily on the increase. From the increase of alcoholism down to the harmless levels of oral pleasures (which have created entire industries) anxiety seems to assume a uniform epidemic pattern. Psychoanalytically there exists a close relationship between oral and visual primitive libidinal patterns, which means that the tremendous modern appeal of moving pictures, television, and illustrated magazines must be included in the pattern.[1]

[1] Karl Stern. *The Third Revolution* (New York, Harcourt Brace and Co., 1954), p. 287.

Writing from the field of biological and cultural evolution, Jacquetta Hawkes sees the present development of the media of communication as evolution in reverse:

> In biological evolution cells multiplied, came together, and were gradually brought into highly organized, co-ordinated and, finally, conscious organisms by means of the central nervous system. Cannot our brain's development of wireless and television and all the related means for extending sights and sounds beyond the individual body to the swarming social body, be a repetition of this on a larger scale? At present the difference appears to be considerable: the evolution of the central nervous system made high consciousness possible, while wireless and television appear to be making it impossible.[2]

Jacquetta Hawkes feels that children are drawn to the television screen "by a fascination such as one can imagine nerves had for the huddled cells a few hundred million years ago."[3] However, she adds that the camera represents a genuine extension of human consciousness: "The ciné camera enables us to change our apprehension of time, stopping, speeding, or slowing it at will, and to convey meaning and feeling, metaphor and simile by visible symbols."[4]

ACOUSTIC SPACE AND VISUAL SPACE

Pessimistic views of the impact of the new media are mostly based on a lack of awareness of what is involved in any or all media of communication. It is necessary in order to get our bearings today to be as basic as Aristotle was when he described speech as the arrest of the flow of thought. How does this arrest occur? By static and stuttering. The sounds we utter are structured in auditory or acous-

[2] Jacquetta Hawkes, *Man on Earth* (London, Cresset Press, 1954), p. 236.
[3] *Ibid.*, p. 237.
[4] *Ibid.*, p. 238.

tic space by noise spaced by silence. (What silence is to acoustic space darkness is to visual space.) Speech is our principal means of structuring interpersonal distances. And these distances are not just physical, but emotional and cultural. We involuntarily raise our voices when speaking to those who do not understand our language. On coming home to a silent house we call a name in a tone intended to extend throughout that space.

Recently in our Seminar in Toronto Sigfried Giedion was explaining some differences between the Egyptian, Greek, and Roman conceptions of space—three stages in the apprehension of space, as it were. The Egyptians had no interest in inner or enclosed space. Their buildings created an outer space. Each building outwardly imposed its own spatiality. The interiors were dark or nonspatial. The Greeks got as far as turning the Egyptian temple inside-out. The dark, introverted space structures of the Egyptians were extroverted to the light on the Acropolis. But the Greek forum and theater are external still. The Roman arch was the first great step in the conquest of inner or enclosed space.

In examining the historical development of the media of communication it is necessary to consider this type of evolution that occurs in a single visual area, because it is inseparably linked to the auditory and other senses. The peculiarity of language, as Paul Elmer More observed, is that it is the medium "by which we undertake to convey experience completely and directly rather than as divided and refracted by a particular organ of perception." Words are an orchestral harmony of touch, taste, sight, sound and kinesthesia. Writing is the abstraction of the visual from this complex, so that with writing comes naturally the power and command over space, vertical and horizontal. *Empire and Communications*, by H. A. Innis, is the first book I know of which even begins an exploration of this area of human experience. Innis studies the horizontal social and political effects of communication changes but not the vertical architectural effects. So far as I know, there is no instance of a pre-literate society with an architecture or a city structure. And the reason, presumably, is that pre-literate man lived in acoustic space, a space structured by sound and incantation. It was not until he had developed the visual equivalent of sound that he learned how to shape and control visual space.

In *From Script to Print*, H. J. Chaytor suggests that with writing comes inner speech or the dialogue with oneself. This would seem to be the result of the action of translating the verbal into the visual (writing) and of translating the visual into the verbal (reading). This is an extremely complex process for which we pay a heavy psychic and social price—the price, as James Joyce put it, of ABCED-mindedness. Literate man experiences an inner psychic withdrawal from his external senses which gives him a heavy psychic and social limp. But the rewards are very rich.

TELEVISION AND POST-LITERATE CULTURE

What I am suggesting is that it is somewhat unrealistic to offer any merely external history of the media of communication, since their history in shaping the inner life of man and society has been and is today inseparable from their outer action. Moreover, today the boundaries between inner and outer effects of the media are confused. And our four-century preoccupation with print has fixed our attention on so limited an aspect of the media that we find it very hard to re-

lease our attention to the whole range of media influence. What I wish to show is that today we experience, in reverse, what pre-literate men faced with the advent of writing. Today we are, in a technical if not literary sense, probably post-literate. Literacy would now appear as a 5000-year phase between pre-literate society and ourselves. Between the invention of printing from movable type and the achievement of television, technology produces a graduated series of mechanical steps toward the complete mechanization of the human sensorium. But television, the last step, may well be a step beyond mechanization. Television may be as decisively the successor to writing as oral speech was the predecessor of writing.

Mathematics and the numerous nonverbal coding devices of science, today constitute the languages which support the structures of radio, TV, and the new visual culture of our age. With the advent of these rivals to verbal languages we can easily discern how traditional vernaculars are themselves the great mass media, that is, specialized frames and vehicles of experience. But the new mass media are less linked to particular places and cultures than verbal languages. And nobody has, so far as I know, begun to consider the present impact of the new media on languages as such. It is possible to find a few casual observations about the effect of writing on speech, of print on vernaculars, and of headlines on literature. Today, we have to tackle the basic questions of the place and future of languages as such. In our time the nature of technological change has been so rapid as to constitute a kind of recapitulation in a few years of all previous cultural evolution. That fact, fully apprehended by James Joyce, provided the matrix of *Finnegans Wake*.

Of course nobody in this century did more to help us to see whole languages as mass media than did those founders of linguistic anthropology, Edward Sapir and Benjamin Lee Whorf. They instituted the means of observing linguistic structures as the fashioning of windows onto reality. The styling of these windows perfectly expressed the preferences and intuitions of a whole culture.

It is necessary to observe the physical media of communication in the same way. An arch, a wall, a tower is as much a form of mass communication as is the press or Rockefeller Plaza. These shapes express a huge preference, an enormous bias in the patterns of our awareness as much as does a new rhythm in poetry or music. And the very pre-existence of such biases in our culture naturally acts to channel all existing experience. Of this fact we are inevitably aware today when the instantaneity of global communication with all previous cultures makes us sensitive to the patterns and bias of our own. To live in an age when global intercommunication is the very format of the most popular press and magazines is to experience that simultaneous awareness of many cultures and many ages which used to be the mark of the very few.

HISTORICAL EXAMPLE OF MEDIA CHANGE

Since in a single article it is impossible to give a historical account of even one medium of communication; and since it is in practice impossible to isolate media of sight and sound from their influence on one another, I shall conclude this discussion with a few historical examples of media change.

In his *Phaedrus*, Plato comments on the then new medium of writing as follows:

> This discovery of yours will create forgetfulness in the learners' souls, because they will not use their memories; they will trust

to the external written characters and not remember of themselves. The specific which you have discovered is an aid not to memory, but to reminiscence and you give your disciples not truth but only the semblance of truth; they will be hearers of many things and have learned nothing . . . they will be tiresome company, having the show of wisdom without the reality.

Two thousand years of manuscript culture lay ahead of us when Plato made these notes. We can imagine what he might have said about Gutenberg and Marconi. But we are still faced with the practical problem of making as good a life and as inclusive a consciousness as we can from the means at our disposal. And our means are very great. Plato seems not to have noticed what is obvious enough to the historian—that writing on light material made possible the road and interstate communication. But if the road fostered efficient administration it also favored invasion, and it broke up the culture of the Greek city states. In the eighteenth century the need to gather and distribute news rapidly brought about good roads in England and America. Empires would seem to have been paper routes.

If we dwell a bit more on the view which Plato offers of the learning process as affected by writing, we can note that a manuscript culture such as had scarcely begun in his time and which persisted until the sixteenth century, makes for a high degree of memorization. This is the inevitable result of the relative scarcity of manuscripts, but it is even more related to the slowness of reading them and the difficulty of referring to them. The ancient and medieval scholar found it easier to memorize than to refer again and again to the contents of manuscript works. By our standards, therefore, manuscript scholars were walking encyclopedias who could quote anything from anything they had ever read.

This, in turn, meant that everybody also leaned heavily on oral means for the intake of information. The oral delivery of and comment on texts was the natural form of teaching in the ages when the publication of a poem meant its oral delivery by the author. In the classroom of the grammar school (up to the age of matriculation), most time was spent in putting down one's own text of authors. The teachers gave out the text, commented on textual variants, and entered into a minute critical discussion of the figures of speech, the wit and decorum of the author phrase by phrase. This involved providing etymologies of the words, the history of their various meanings, and their social background and implications. Each student, therefore, made his own grammar, his own dictionary, rhetoric, and commonplace book. Such was the practice of classrooms in Shakespeare's day, a century after the invention of printing.

But, so far as the classroom was concerned, printing was decisive. Uniform texts became available along with the grammars and dictionaries not only of Latin but of Greek, Hebrew, and the vernacular tongues. Naturally, from the point of view of previous education and learning this made a shambles. The flow of information shifted from the oral to the printed form. Emphasis shifted from wit, memory, and oral dialectic to multilingual erudition. Print made not only many more past texts available but also large quantities of chronicle and historical matter which the medieval classroom could not possibly have found time to copy or discuss. Not only classical authors but the Church Fathers became easily accessible.

This was a cultural revolution which, from the point of view of the classroom, called for drastic measures. For secondary

education must always concern itself with developing critical power of discrimination with reference to the channels of maximal information intake.

When the main channel of information became the printed page (which could be read very much more rapidly than the written page) the critical powers of the young could not be trained in the same way. Print, moreover, isolated the learner. The student who had formerly recited the lecture in a group and had then joined another group to discuss and dispute the points of the lecture was now alone with a text. (In the same way, print isolated cultures each in its own vernacular frame, where before all learning was in a single tongue.) Yet anybody can test for himself the fact that sixteenth-century prose still retains many of the rapidly shifting perspectives of multiple levels of tone and meaning which characterize group speech. It took two centuries of print to create prose on the page which maintained the tone and perspective of a single speaker. The individual scholar, alone with his text, had to develop habits of self-reliance which we still associate with the virtues of book culture. More and more learning was left to the unassisted industry of the individual. The first age of print saw hosts of prodigies who at ten or twelve had scanned all available authors in several languages. People were consumed by an "immoderate hydroptic thirst for humane learning and languages," in Donne's phrase, which went along with the first discovery of the smooth speedways of the printed page. No more stuttering pilgrimages through the crabbed columns of manuscript abbreviations. But it was a long time before people got to be at home with print and learned how to assimilate it to the classroom and the whole culture. And by that time the newspaper page layout had begun to disturb the precarious equilibrium of eighteenth century book culture. The format of the nineteenth-century newspaper page was really like a dozen book pages set on a single sheet. The telegraph gave this format a character it still retains—the instantaneous global cross section of a single day. This was no longer the book. Nor could the book stand up to this new cultural form born of technology. So the book had to swallow this rival. Joyce did it in *Ulysses*. Eliot did it in *The Waste Land*. These are epics which incorporate the newspaper art form.

The newspaper was merely the first of a quick succession of new information channels which challenged the cultural balance and the classroom procedures of our world. So far as this writer can see, only the artists of our time have met or understood the challenge. In fact, it is only by careful study of the history of changing techniques of representation in the arts that it is possible to grasp the inner dynamics of social change. The mind of the artist is always the point of maximal sensitivity and resourcefulness in expressing altered realities in the common culture.

With the arrival of print, Erasmus and his humanist colleagues saw exactly what had to be done in the classroom. They did it at once. With the arrival of the press, nothing was done. If print was the mechanization of the handicraft of writing, the telephone was the electrification of speech itself, a big step past the telegraph. Gramophone and movie were merely the mechanization of speech and gesture. But the radio and TV were not just the electrification of speech and gesture but the electronification of the entire range of human personal expressiveness. With electronification the flow is taken out of the wire and into the vac-

uum tube circuit, which confers freedom and flexibility such as are in metaphor and in words themselves.

Keeping in mind the extraordinary complexity and range of impact of the mere mechanization of writing by Gutenberg and measuring that impact merely by the total change of procedure in the sixteenth century classroom, I think we should try to imagine how sweeping a revolution should have taken place in our classrooms a century ago.

Applying my principle that education must always concentrate its resources at the point of major information intake, we have merely to ask, From what sources do growing minds nowadays acquire most factual data? How much critical awareness is conferred at these points? It is a commentary on our extreme culture lag that when we think of criticism of information flow we still use only the concept of book culture, namely, how much trust can be reposed in the words of the message. Yet the bias of each medium of communication is far more distorting than the deliberate lie. The format and tone of some press styles may make the very concept of truth irrelevant. The most urgent and reliable facts presented in this way are a travesty of any reality. The technological format of the *New York Times* is far more significant than any single report it could ever print. Editorial policy or intention is of minute effect compared to the art form of the page itself. And until we understand that the forms projected at us by our technology are greatly more informative than any verbal messages they convey we are going to go on being helpless illiterates in a world we made ourselves.

We could do for the classroom of our century what Erasmus did for the classroom of his time. We could make it the matrix of a cultural flowering much greater than that of the Elizabethan Age. For we possess, and to some degree we already experience, the facts of media cross-fertilization. The great eras of culture occur when a large area of oral or auditory experience is invaded by a visual medium. For the Elizabethans the whole folk wisdom of oral culture, centuries of oral disputation, and a huge backlog of vocal music were cross-fertilized by the printed page. A very rich auditory heritage was exposed via a visual medium with spectacular results.

Today we are living in what is in many ways the greatest period of culture in the history of the world. The auditory and oral heritages of some cultures are being poured through the visual traditions of other cultures to the enrichment of all. But even movies and television are very different media, so, as is natural, the same items handled through both of these become quite changed.

One concluding historical observation about the media. Just as history begins with writing, so, in a sense, it ends now with television. Just as there was pre-history when there was no linear time sense, so there is post-history now when everything that ever was in the world becomes simultaneously present to our consciousness.

Printing greatly increased the scope of historical awareness; telegraphy and television completed the process by making the past twenty-four hours or the past twenty-four millennia equally present. This is to say that the media themselves act directly toward shaping our most intimate self-consciousness. Without our having any ideas about them whatever, they still deeply affect our idea of past and present, of ourselves, and of our relations to others.

Communication Arts in the Curriculum*

Some Educational Implications of the Philosophy of Susanne Langer

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CHARACTERISTIC of present-day research is the frequent discovery of insights in other disciplines that illuminate our own research and teaching fields. This is certainly true for those of us concerned with the teaching of English, Communication Arts, and the Humanities who have come to know the work of Susanne Langer. In the past twenty-five years she has published four major books, *The Practice of Philosophy* (1930), *Introduction to Symbolic Logic* (1937), *Philosophy in a New Key* (1942), *Feeling and Form* (1953), and in the *Hudson Review* an essay entitled "The Primary Illusions in the Great Orders of Art." The latter three have introduced us to new conceptions of symbolization that provide a working approach to the language of science and the language of literature, and to significant differences between literature and the other arts.

In the Interdivisional Program in Communication at Teachers College there has been additional opportunity for pre-service and experienced teachers and College staff to know Susanne Langer. She has been an active participant in the program. Each year from 1944 to 1951, and again in 1954, she lectured before the interdivisional course, Communication and Communication Arts in the Modern Community. During the winter and spring semesters of 1949-50, while the *Hudson Review* article and *Feeling and Form* were being written, she conducted the Seminar in Communication. And since its publication, *Philosophy in a New Key* has been required reading for the more than two hundred pre-service and experienced teachers enrolled each year in the interdivisional course.

Occasionally some of these students and successful teachers are puzzled by Susanne Langer's unequivocal statement in lectures that "The arts do not communicate," and her careful specification in *Feeling and Form* that a work of art does not "say anything," does not ". . . in all semantic strictness . . . effect a communication between its maker and his fellows. . . ."[1] They show similar uncertainty when in answer to their question, "What does your philosophy have to do with classroom teaching?" she replies in so many words, "I don't know. I feel no

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[1] Susanne K. Langer, *Feeling and Form* (New York, Charles Scribner's Sons, 1953), p. 393.

responsibility for delineating the educational implications of my work. I leave such extensions as there may be to other teachers and professors to discover and develop."

Despite her disclaimer of interest in education, Professor Langer writes in *Feeling and Form* that "The power to conceive of life as a single span enables one also to think of its conduct as a single undertaking, and of a person as a unified and developed being, a personality. Youth, then, is all potentiality, not only for physical growth and procreation, but also for mental and moral growth."[2] And despite her perspicacious limiting of the meaning of "communication," she writes, in terms consistent with Phenix's "A Philosophic View of Communication" (pages 80 to 85), that "A work of art . . . may truly be said to 'do something to us,' . . . to formulate our conceptions of feeling and our conceptions of visual, factual, and audible reality together. It gives us *forms of imagination* and *forms of feeling*, inseparably; that is to say, it clarifies and organizes intuition itself."[3]

Some of Susanne Langer's idiom is familiar to teachers; some is not. She is concerned with developing relationships between the arts and sciences, yet her phrasing of *discursive* and *non-discursive modes of symbolization* has not been common to all teachers who have worked in general education programs in sciences and humanities since the early 1930's, and in communication arts and skills since World War II. She is concerned with all the arts, as humanities teachers are, but less with them as symbols of culture than as "the creation of forms symbolic of human feeling."[4] and not in the least with them as "languages" with a common message. She is concerned with art in daily living as professional educators are, but not as "worthy use of leisure time" or factors in "life adjustment" or as "special subjects" in school; she is concerned with the ways the arts help to mature our perception of ourselves in our environment. With such questions and divergent phrasings unresolved there is obvious loss to us all—students, teachers, and community. The purpose of this discussion is to select from Susanne Langer's comprehensive treatment of language and other art mediums the seminal concepts that seem at this time to have potential significance for teachers who are concerned with the communication arts and with articulating arts experiences for young people from elementary school through high school and college.

[2] *Ibid.*, p. 332. [3] *Ibid.*, p. 397.
[4] *Ibid.*, p. 40.

PSYCHOBIOLOGICAL BASES

It seems appropriate to take our initial cue from "youth . . . is all potentiality" and then move farther back in the chronology of human life to the moment of first independent participation in environment, the moment of the child's birth cry, which symbolizes the complete awakening of the whole organism. Figuratively, it throws the switch which starts the lifelong electrical-chemical-mechanical process that will structure the evolving self of this new person.

Close observation during the deft *post partum* separation and cleaning of mucus from the child's throat shows that the new little organism lies rigid. It seems to be in suspended animation. Then, with the exhalation of the first air to have filled its lungs, it experiences an organic paroxysm involving every fiber of its neuromuscular system. Vocal cords vibrate; the respiratory system establishes its rhythm; muscular tensions relax and the bladder empties; arms and legs lose

their rigidity; eyes open for a brief unfocused exposure on moving objects in space; eardrums vibrate to the "blooming buzzing confusion"; and the organism settles into sleep. It has completed its first cycle of tension-expression-relaxation.

The rest of the healthy child's life will consist of a succession of comparable cycles—what Susanne Langer terms "a stream of tensions and resolutions"—and the quality of the life will vary with the degree of refinement achieved in each of these essential processes. The automatic vibration of vocal cords may take on the refined control of larynx, lips, tongue, and diaphragm to imitate the speech sounds and patterns of the environal culture. The unfocused vision may sharpen to perceive and discriminate size, shape, shade. Mere noise may become discernible as volume, tone, rhythm, pitch, quality. Undisciplined thrust of fists may be refined to the point of setting down a secondary set of symbols to redeem speech from transience. Spasmic kick of feet may become controlled power as coordinated as interpretative dance.

Each refinement is potential in varying degree for the healthy individual; each develops through transactional participation in environment; each is contributive in a primary way to the orientation of the "unified and developed being" in space-time-energy and the varied currents of accumulated and contemporary culture.

TWO SYMBOLIC MODES

To continue in words from *Philosophy in a New Key*, "Man's conquest of the world undoubtedly rests on the supreme development of his brain, which allows him to synthesize, delay, and modify his reactions by the interpolation of *symbols* in the gaps and confusions of direct experience, and by means of 'verbal signs' to add the experiences of other people to his own."[5] Later we proceed to the general theory of symbolism, which distinguishes between two symbolic modes (discursive and non-discursive) through which man is at once able to handle the "great intellectual structures—science, history, and the hybrid we call 'natural history,' "[6] and to give form and fabric to our life of feelings. Discursive symbols provide correlation between names and things and between concepts and things. They are verifiable and duplicable; they conform to the laws of syntax or of mathematics. They may be understood serially. Non-discursive symbols, however, are neither verifiable nor duplicable, for they depend on personal perceptions at a given point in space-time. They are neither serial nor additive, for "All cognition of form is intuitive; all relatedness —distinctness, congruence, correspondence of forms, contrast, and synthesis in a total *Gestalt*—can be known only by direct insight, which is intuition."[7] They do not represent actual experiential events or feelings; they do represent moving experiences in religion and myth, and ideas of feelings and illusions of virtual experience in the arts—the illusion of virtual space in plastic arts; the illusion of virtual time in music; the illusion of virtual power in dance; the illusion of virtual memory in literature; the illusion of virtual dream in the motion picture.

A CONSTRUCT

The distinction between discursive and non-discursive symbols is a central feature of *Philosophy in a New Key*. The discriminations they afford us in handling both actual and virtual experience are the central feature of *Feeling and Form*. The

[5] Susanne K. Langer, *Philosophy in A New Key* (Cambridge: Harvard University Press, 1942), p. 29.

[6] *Ibid.*, pp. 277-78.

[7] *Feeling and Form*, p. 378.

diagrammatic construct below shows the relation of these two concepts to human growth.

At the center is the person—each of our students, or each of us, let us say, when we were "all potentiality" to develop from the instinctive purposiveness of the baby, through the perceived purposiveness of the early adolescent, to the conceived purposiveness of the self-conscious self. The direction of human development is toward the complete understanding and control of all the conditions of life, represented by the outer circle—the constantly expanding limits of human knowledge and understanding of feeling. The five major sectors of the perimeter stem from Susanne Langer's delineation of four great orders of art, plus the motion picture, to which she devotes the Appendix of *Feeling and Form*. The sectors include the realms of discourse,

THE SOURCES OF CURRICULUM

DISCURSIVE AND NON-DISCURSIVE SYMBOLIZATION: APPROACHES IN FACT AND FEELING TO FIVE ASPECTS OF HUMAN EXPERIENCE

through which we orient ourselves factually in space-time-energy and culture, and the complementary non-discursive art forms, through which we get the life of fact and feeling into form. Let us look briefly at the division of labor in the two symbolic modes in each sector.

SPACE AND VIRTUAL SPACE

"When the spatial experience of everyday life is refined by precision and artifice of science, space becomes a coordinate in mathematical functions."[8] We deal with it actually and conceptually through discursive symbols in physics, mathematics, geography, astronomy, and so forth.

But delineation of this experiential space in which we live is not the purpose of non-discursive symbols of art. "The harmoniously organized space in a picture is not experiential space, known by sight and touch, by free motion and restraint, far and near sounds, voices lost or re-echoed."[9] It is entirely visual space which is created by the organizing shapes and shades of the physical picture, statue or building. This visual space is, therefore, an illusion of virtual space, which is the primary illusion of all plastic art.

There are three major manifestations of virtual space: painting, whose primary illusion is *virtual scene;* sculpture, whose primary illusion is "*virtual kinetic volume*, created by—and with—the semblance of living form";[10] and architecture, whose primary illusion is that of *virtual ethnic domain*, which as "environment made visible . . . embodies the feeling, the rhythm, the passion or sobriety, frivolity or fear . . ." of human relations and activities carried on within the architectural environment. In our form of culture the home, for instance, is a counterpart of the self and stands as "the symbol of humanity to be found in the strength and interplay of forms."[11]

TIME AND VIRTUAL PASSAGE

"We have only one way—the way of the clock—to think discursively about time at all."[12] And clock time, or calendar time, or geologic time is simply the measurement of change by contrasting or comparing two states of an instrument, or dates in history, or data in geology.

In contrast to measurement of time with instruments, we experience time non-discursively through music, whose symbolic power lies in the fact that it creates a pattern of tensions and resolutions. "Time exists for us because we undergo tensions and their resolutions. Their peculiar building-up and their ways of breaking or diminishing or merging into longer and greater tensions" afford us the illusion of passage. "The primary illusion of music is the sonorous image of passage, abstracted from actuality to become free and plastic and entirely perceptible."[13] It is this plasticity and freedom which provide for a secondary illusion of virtual space; but it is a secondary one, and not the primary contribution of music to human experience.

POWER AND VIRTUAL POWER

Primitive man lived in a realm of powers, of animistic forces, which he explained to his satisfaction in myth, harmonized with his spiritual needs in religion and controlled through dance.

Modern man lives in a world of power —atomic power, power politics, the power of the press, of public opinion, of words or of positive thinking, and pow-

[8] *Ibid.*, p. 72.
[9] *Ibid.*, p. 72.
[10] *Ibid.*, p. 89.
[11] *Ibid.*, p. 99.
[12] *Ibid.*, p. 111.
[13] *Ibid.*, pp. 112-13.

erful personalities, "interests," lobbies, and the like. But because we know more than did primitive man about the constitution of man and the universe, and have developed technologies for measurement, prediction, and control of these forms of power, we have in large measure rebuilt the animistic world into a world of reason. We operate this world through the discursive use of mathematical, graphic, and linguistic symbols, with which we control the release of energies or plot "fields of force" in all our relations in space-time. We do this in physics, politics, political science, theology, sociology, ecology, and so forth.

Beyond the satisfactions of rational control, we need to symbolize or give form to our feelings about the pervasive forces and influences which impinge on our lives. We need to integrate these kinesthetically into our whole neuromuscular system as the most basic aspect of orientation in space-time. Here the non-discursive symbolism of the dance "finds its true creative aim" in making the world of power experienceable and visible for participant and percipient alike. "The primary illusion of dance is a virtual realm of Power—not actual, physically exerted power, but appearances of influence and agency created by virtual gesture."[14]

THE PAST AND VIRTUAL MEMORY

Language is the most complex, and as Langer says, "momentous" invention of the human mind. Elaborating this point, she quotes Edward Sapir:

> It is best to admit that language is primarily a vocal actualization of the tendency to see reality symbolically, that it is precisely this quality which renders it a fit instrument for communication and that it is in the actual give and take of social intercourse that it has been complicated and refined into the form in which it is known today.[15]

Our verbal world is our primary world of reality. Language, as we have already observed in the discursive handling of concepts of space-time-energy, is the medium for conceptualizing, recording, and accumulating experience. It is the primary medium in which we transmit culture, evaluate it, and provide for innovation in it. Language is the primary medium through which we conceive of self and the functions of discursive and non-discursive symbolism in maturation of self.

The linguistic forms, the words, are identical in both symbolic modes. In the "great intellectual structures" of history and science, and in the accumulations of criticism, philosophy, and biography we maintain our discursive record of the course of our individual and cultural past. "For practical purposes we do not need to remember an unbroken past, but only to reconstruct salient moments that mark successive stations in the progression of events known as our 'life.' "[16] In the great literary forms, the poem and the novel, and in the dramatic forms of comedy and tragedy, we use language to create the non-discursive symbols of this same life. Here, too, we select only salient moments but always in "a self-contained form, a unit of experience, in which every element is organically related to every other, no matter how capricious or fragmentary the items are made to appear."[17]

Actual experience has no such closed form. But memory, as the great organizer of consciousness, "simplifies and composes our perceptions into units of per-

[14] *Ibid.*, p. 175.

[15] *Philosophy in a New Key*, p. 109.

[16] "The Primary Illusions in the Great Orders of Art," *Hudson Review*, Summer, 1950, p. 229.

[17] *Feeling and Form*, p. 262.

sonal knowledge."[18] These units provide what Langer variously terms "the illusions of experience," "the semblance of a lived event," "a piece of virtual life," or "virtual history," all in the mode typified by memory. For this reason the primary illusion they create is the illusion of a "virtual past" or "virtual memory."

Within the encompassing literary illusion of virtual memory, purely linguistic factors such as tense make it possible to differentiate the temporal modes in which the author and his audience participate in this virtual life. Poetry creates the illusion of experience lived in the contemplative *present*. The novel creates the illusion of experience lived in the evaluative, perhaps nostalgic, *past* as it deals with our most pervasive contemporary interest, the hazards of personality. What of the *future?*

Langer differentiates sharply between literature and drama as art forms. "As literature creates a virtual past, drama creates a virtual future. The literary mode is the mode of Memory; the dramatic is the mode of Destiny."[19] Teachers find this distinction in time-sense well made; yet for many who have grown up in our print-minded culture to think of drama as a literary "type," it may seem more appropriate to place drama in a pattern of type-time relationships such as poetry-present, novel-past, drama-future rather than to establish it as a separate art form. This seems not to misinterpret Langer's rationale, for she does write later that "Dramatic action is a semblance of action so constructed that a whole, indivisible piece of virtual history is implicit in it . . . long before the presentation is completed. This constant illusion of an imminent future . . . is 'form in suspense.' "[20]

[18] *Ibid.*, p. 263.
[19] *Ibid.*, p. 307.
[20] *Ibid.*, p. 310.

DREAM AND VIRTUAL CREATIVE IMAGINATION

Thus far Langer has led us to examine primary aspects of human experience in which the maturing person necessarily must "find" his self—the resolution of personal and cultural tensions in space-time-energy and the integration of personality through an enlivened sense of aspects of time. These are not newly discovered aspects of life. They are as old as man. So also is the dream. But our development of disciplines for investigation of dream is relatively new. We study and transmit them through discursive symbols in psychology and psychiatry.

Contemporary with these new fields is the relatively new medium of film and its art form, the motion picture. It creates illusions of virtual space, virtual time, and virtual powers and, like literature, illusions of a virtual present, a virtual past, and virtual future, in which a viewer, like a dreamer, is always at the center of attention. These illusions, however, are secondary ones.

The primary illusion arises from the nature of the medium and its unique use of visual and auditory montage. The observer "sees" through the lens of the camera. What he experiences is a rapid shifting of scene and perspective and tempo—a shifting of himself, as participant, in space-time. Nowhere else in his experience, except in dream, is he able to range so widely without physical movement or participation in environment.

In the motion picture, the montage results from a conscious editing of film; also the perception of unifying relationships among edited lengths of film is, in the last analysis, the observer's conscious responsibility. What he "creates" from the montage is his own imagined experience, very much as in actual life he cre-

ates the form world of his experience from his own perceptions. The primary illusion of film, therefore, is "virtual dream" or "virtual creative imagination."

IMPLICATIONS FOR CURRICULUM

In these five aspects of human experience we have come full circle, diagrammatically, in our concern for the function of symbolization in the realization of human potentiality. We have come to think in new terms of two distinct modes of symbolization, discursive and non-discursive; of the unique primary contributions of each art form to full comprehension of a phase of human experience; and of the gradual refinement, from organic paroxysm to organized proficiency, in each mode and form as constituting the process of maturation. Provision for *all* aspects of this process is the function of education.

What are some of the next stages of refinement of curricular patterns through which we can use these concepts in our efforts to develop the "well-rounded person"? Obviously we should not attempt prediction of the infinite variety of applications which the insights of many teachers will bring forth in the next several years. We should consider, though, some of the redefinitions of key terms and concepts that may come about as the result of further acquaintance with the work of Susanne Langer. We should further such trends in definition as these:

1. **From** consideration of curriculum content as an accumulated body of knowledge available in libraries and lectures, **toward** recognition of content as a functional aspect of the growth process; as the composite of facts acquired, feelings enlivened, processes developed, and attitudes engendered in the process of self-realization.

2. **From** a loose use of the term "creative" as applied to art rather than science (or to writing poetry or painting pictures as distinct from journalism or commercial illustration), **toward** recognition of "creative" as applicable to any original organization of material in discursive or non-discursive symbols.

3. **From** designation of "scientific method" as a special form of inquiry or verification used by scientists or scientifically oriented laymen, **toward** recognition that the creative work of both scientist and artist stems from intuitive perception of pattern and moves forward with meticulous attention to detail. Difference lies in the nature of symbols used in various mediums rather than in method.

4. **From** preponderant emphasis on and use of discursive materials, **toward** provision of opportunities for students to use varied arts in clarifying and interpreting the feel and feeling of both discursive and non-discursive materials.

5. **From** preoccupation with simple linear thinking about cause-effect relationships in unrelated segments of experience, **toward** pattern thinking, which provides for perception of relatednesses, design, *Gestalten*. This shift will manifest itself not only in formal and informal provision for cooperation in core programs of many varieties, but also (and perhaps more importantly) in classroom teaching method, where teachers will see their responsibility not to impart or structure ready-made patterns of experience, but to make the elements of pattern available in such a way that the thrill of discovery and memorable individual insight will reward studious effort and lay the attitudinal base for continued responsible participation in democratic processes.

6. **From** curricular treatment of some arts as "special subjects," **toward** recog-

nition of all mediums as equivalently significant.

7. **From** grouping of "related arts" in elementary and secondary school as simply varied forms of self-expression, and in college study of the humanities primarily as symbols of culture or exemplifications of aesthetic principles, **toward** provision of opportunities for students to use selected mediums for interpretation of the meaning of experience with appropriate phases of life.

8. **From** predominant grouping of social studies and language arts in various kinds of core organizations, **toward** recognition of the need for a communication core, in which students may learn language and other art skills and attitudes appropriate for handling the major aspects of experience in both discursive and non-discursive modes.

Beyond these general redefinitions, Langer's work carries implications for teaching in each communication medium. • In visual and plastic arts, which she terms the most significant for our day, we may anticipate added interest in home and public architecture and city planning. • In music, in which she is most thoroughly at home, we may anticipate increased instruction in skills for improvisation, and marked increase in attention to contemporary music for its value in helping us "compose our selves" amidst the arhythmic tempo of our day. • In physical education we may see the currently increased interest in dance still further extended and accented for both boy and girls. • In language we may see close attention to development of skill in speaking, listening, reading and writing in both discursive and non-discursive modes. • In literature we may see new approaches which accent the illusion of virtual life, including even the evaluation of the remaining content of culture in science, history, religion and other arts. • In motion picture and television, currently popular phrasings such as the "literature of film" and "reading the screen" are turning attention to the narrative-dramatic delineation of the "hazards of personality." We may not be quite ready to deal with the primary illusion of film, though continued critical interest in production and perception may, by analogy, bring new insights into curriculum as a pattern of montages for swift but efficient teaching of key reference points and relationships in our rapidly accumulating cultural content. Present evidences of this trend lie in broad field organization of general education programs in colleges, and in such publications as *Touchstones of Literature*, developed by the Metropolitan School Study Council.

These are only beginnings, which have grown up simultaneously with film. Motion picture is not the primary medium of instruction in these two instances; but shifting student-teacher ratios at every instructional level, plus the availability of motion picture and closed-circuit television, may accelerate and broaden its use. More important, if motion picture materializes as a primary medium for developing the creative imagination, it may be our most significant stimulant to cultural innovation. Effective education in this aspect of experience could bring us as a people more rapidly to a wider realization that the most important thing in our environment is other people—and that the operating design of our great science-centered industrial, economic, and political structures must include the values of the individual, for which the arts speak.

Helping Students Observe Processes of Communication*

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It is difficult to read long in the scholarly literature about communication without discovering various models, constructs, or paradigms which are offered as descriptions of the complete communication process or some special part of it. These models—to settle on the term which seems to be most widely employed—are used by research workers to express the range of factors which need to be considered in analysis of any act of communication, and to show something about the relationship between these factors. The models show points at which further research is indicated, and they permit the scholar, through the process of formulating them, to think through the field which he hopes to describe and study.

For several years members of the Communication Skills staff at Teachers College have expressed the belief that these models which are so useful to research workers could also have practical value for students in general education courses in communication in high schools and colleges, if the models were modified, adapted, and "translated" into appropriate language. Part of our frankly experimental interest in models came from the stimulation of Lennox Grey's challenge to work toward an "ecology of communication," in which a student could be helped to see a number of factors which impinge upon communication, in place of the customary concentration on a single factor such as the linear structure of a paper or a speech. The models which were being proposed by Wilbur Schramm, Wendell Johnson, Harold D. Lasswell, Claude E. Shannon and Warren Weaver, Eugene L. Hartley and Ruth E. Hartley, Jurgen Ruesch and Gregory Bateson, among many others, were *not* that "ecology," but they provided a way of moving ahead at a sensible rate with materials which were already gaining currency in fields such as psychology, sociology, information theory, philosophy, and psychiatry.

Similar explorations with research models as teaching devices for use in classes in Communication Skills, Communication Arts, General Communication, and similar undergraduate courses have been conducted in many places. For economy of focus, however, this article will draw only upon the Teachers College experience in Communication Skills courses, and then with only two models—the Lasswell "Formula" and the Shannon-Weaver construct.

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The undergraduate courses in Communication Skills at Teachers College—not to be confused with the graduate courses in the Interdivisional Program in Communication and the Communication Arts—are offered by the Department of the Teaching of English and Foreign Languages. The students come largely from the Division of Nursing Education, although a few are majors in music education, art education, childhood education, and other fields. About half of these students are mature and experienced persons, many holding responsible positions in hospitals, public health agencies, or schools. The other half are young people beginning their careers. Most of them have chosen a profession. They are not "typical" freshman, then, although their problems in communicating are generally similar to those of other beginning college students.[1]

THE LASSWELL "FORMULA"

One of the clearest ways of seeing in bold design five principal variables in any act of communication is to consider the analysis of communication processes suggested by Professor Harold D. Lasswell of the School of Law, Yale University. This analysis is popularly known as the Lasswell "Formula," even though it is not a formula at all, and even though it was originally designed as a way of classifying communication studies, not as an instrument for studying communcation in general education.

Lasswell writes:

> A convenient way to describe an act of communication is to answer the following questions:
>
> Who
> Says What
> In Which Channel
> To Whom
> With What Effect?

The scientific study of the process of communication tends to concentrate upon one or another of these questions. Scholars who study the "who," the communicator, look into the factors that initiate and guide the act of communication. We call this subdivision of the field of research *control analysis*. Specialists who focus upon the "says what" engage in *content analysis*. Those who look primarily at the radio, press, film and other channels of communication are doing *media analysis*. When the principal concern is with the persons reached by the media, we speak of *audience analysis*. If the question is the impact upon audience, the problem is *effect analysis*.[2]

This five-part question has become a classic in the field of advanced communication study. One scholar or another would add other elements for purposes of emphasis or refinement (as Lennox Grey would add "In What Situation?" or Herbert Hyman, from a sociologist's background, would add "With What Immediate Response?"), but the basic structure remains essentially the same. Students in our undergraduate courses are generally as much interested as the scholars in adding other factors which seem significant to them, and this act of suggesting revision is an important learning experience. The "Formula" is introduced not as a fact or rule which should be memorized and accepted, but rather as an instrument which has utility only as it helps a person see points in a process which need to be studied.

[1] For a detailed account of the Communication Skills courses at Teachers College, see William E. Hoth, "The Development of a Communication Skills Course: A History of the Undergraduate Program in Communication at Teachers College, Columbia University." Unpublished Doctor of Education Report, Teachers College, 1954.

[2] Harold D. Lasswell, "The Structure and Function of Communication in Society," in *The Communication of Ideas*, edited by Lyman Bryson (New York, Harper & Brothers, 1948), p. 37.

USING THE LASSWELL "FORMULA" IN THINKING ABOUT COMMUNICATION

"Formula"	*Typical Concerns of a Communication Research Worker*	*Typical Concerns of a Student in Thinking About Personal Communication*
WHO	Who initiates, produces or controls communication products or channels? In complex mass communication situations, what combination of talent, technological skill and economic underpinning operates? Who makes crucial decisions? Among key people in the control structure, how do factors of background, education, sex, class, and the like affect purposes and procedures? What symbolic qualities are embraced in these key figures?	Assuming that every person plays many roles in daily living, who am I in this communication situation? A student writing for or speaking to a teacher? An expert? A prospective employee? A friend? A son or daughter? A citizen in the community? Am I known or unknown to my audience? Does my audience have a pre-formed view of me? Am I the right person to do this job of communication?
SAYS WHAT	What is the content of the products of communication? What point of view, idea, philosophy or doctrine is found in the message or in a series of messages over a period of time? What is the structure of symbols used to transmit the message, and on what key repeated symbols does the message rest? What is revealed through the study of latent content about the purposes or predispositions of the originator?	Exactly what is it that I want to say in this particular communication situation? Are my purposes clear, well defined and limited? Am I competent to treat the subject, or, if I am not, can I gain that competence? Is my audience informed about the subject? What conventions should be followed in treating this subject? On what key symbols should the message rest?
IN WHICH CHANNEL (Through what medium)	Technically and economically, what channels of communication are available? What control structure operates within the various channels? How are the channels affected by censorship or self-regulation? What audiences give attention to the various channels? Artistically, what are the possibilities and limitations of the several mediums?	Among the mediums which I have at hand, which is most appropriate for this communication job? An informal note? A formal letter? An article? A telephone call? A personal visit? A research paper? Can the job be done better by a non-visual medium—poster, bulletin board, film, series of photographs with captions, or drawings? Or is some combination of these mediums indicated?
TO WHOM	What is the nature of the various audiences which are involved in communication in the community? What can be discovered about audience preference for particular mediums and particular subjects? How do factors such as age, sex, class, geographic location, educational background, and religious preference affect these preferences? What expectations and goals are found in particular groups? What taboos can be anticipated about medium or content?	Who is my audience? Do I have a specific audience (composed of one or more individuals) in mind, or am I guilty of thinking of a nebulous "general audience"? Have I studied the characteristics of my audience in terms of education, occupation, age, background, religious preference, and like matters? What expectations does my audience have? How can I promote two-way communication between me and my audience?
WITH WHAT EFFECT? (With what intended effect?)	What happens as a result of the communication act? What demonstrable results can be shown? Were the observable effects expected or unexpected? Is there a difference in immediate and delayed effect? How can the more subtle effects of communication be measured? What aspects of behavior can be related to the nature of the originator of communication, to the content, to the channel, to the nature of the audience?	What do I want to achieve as a result of this communication? Do I want to change behavior? If so, why should my audience be interested and what do I expect them to do? Do I want to offer a work of "self-expression"? If so, am I prepared to avoid the limitations of purely private communication by keeping in mind an audience other than myself?

Principal emphasis in the quotation from Lasswell is on analysis of mass communication situations, but for purposes of general education the emphasis may be shifted readily to personal communication without distortion. The accompanying chart suggests some of the questions which individuals and classes might raise in thinking through Lasswell's five-part question. The "Formula" is stated in the first column. The second column lists some of the questions which a research worker in communication might ask. The third column lists a number of questions which a student might ask himself in thinking through personal communication situations.

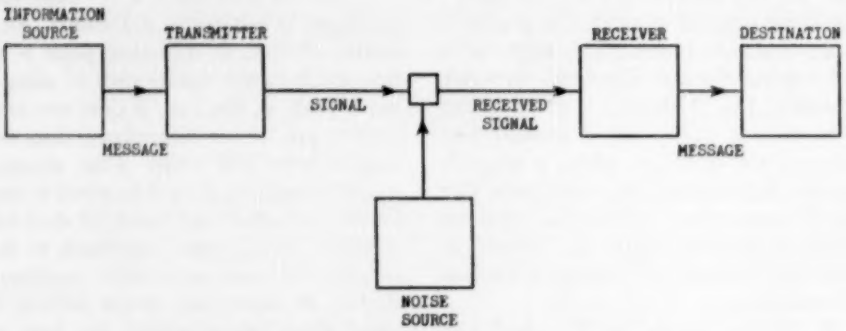
In thinking about the "Formula" and looking at the chart for present purposes, four special matters should be noted. First, the construct can be used both as a predictive instrument (to study a communication problem in advance) and as a device for thinking in retrospect about an act of communication which has been completed. Second, the "Formula" permits one to consider the possibilities of many mediums of communication—verbal and non-verbal. This is an important point, for any schema which focuses attention on language alone in our current society is only partially adequate. Third, teacher and student can approach the Lasswell instrument in a variety of ways. On one occasion the principal point of emphasis might well be nature of audience; at another time, choice and characteristics of medium. Fourth, although Lasswell writes about scientific investigations into the field of communication, teacher and student must recognize that they are making only a gesture in that direction. For classroom purposes in general education, the complicated and painstaking methods of research in content analysis, for example, would be used sparingly, if at all. But the gesture toward scientific behavior, principally in the direction of helping students *observe* the relationships among these five factors, is extremely important.

It can be seen now why Lasswell's paradigm is not really a formula. As a matter of fact, to miss that point is to miss much of the significance of using a model such as this one. It does not lend itself to precise quantification; it does not suggest how and under what circumstances weighting should be given to one factor or another; and, finally, it does not offer an "if . . . then" approach to the solution of communication problems. Rather, in direct and simple fashion, it offers check points which can help to guide a student to the personal decision which every choice of word or word order or organizational pattern involves.

THE SHANNON-WEAVER MODEL

Another model which helps one visualize the communication process is the schematic diagram used by Claude E. Shannon to illumine his mathematical theory of communication. Shannon, a mathematician in the Bell Telephone Laboratories, is concerned primarily with the technical problem of transmitting symbols with accuracy, and his analysis of that problem is of little value to those of us who are still mathematically illiterate. Warren Weaver, Director of the Division of the Natural Sciences of the Rockefeller Foundation, offers some "heuristic suggestions for generalizing the theory to the broad problem of social communication," and from him, principally, one gains clues for translating certain portions of the model into the purposes of undergraduate study in communication. It is because of Weaver's important analysis of Shannon's original material that the

material is ascribed by hyphenation to both men. Additional imaginative interpretation of the theory has come recently from the 16 mm. film *A Communications Primer*, of which more later.



SCHEMATIC DIAGRAM OF A GENERAL COMMUNICATION SYSTEM

The diagram which was suggested by Claude E. Shannon appears above.[3]

Quoting from Weaver, and referring to the diagram:

> The *information source* selects a desired *message* out of a set of possible messages. . . . The selected message may consist of written or spoken words, or of pictures, music, etc.
>
> The *transmitter* changes this *message* into the *signal* which is actually sent over the *communication channel* from the transmitter to the *receiver*. In the case of telephony, the channel is a wire, the signal a varying electrical current on this wire; the transmitter is the set of devices . . . which change the sound pressure of the voice into the varying electrical current. . . . In oral speech, the information source is the brain, the transmitter is the voice mechanism producing the varying sound pressure (the signal) which is transmitted through the air (the channel).
>
> • • •
>
> In the process of being transmitted, it is unfortunately characteristic that certain things are added to the signal which were not intended by the information source. These unwanted additions may be distortions of sound (in telephony, for example) or static (in radio), or distortions in shape or shading of picture (television), or errors in transmission (telegraphy or facsimile), etc. All of these changes in the transmitted signal are called *noise*.
>
> • • •
>
> . . . the function of the transmitter is to *encode*, and that of the receiver to *decode*, the message.[4]

At the risk of vast oversimplification of the diagram and of the theory behind it (referring the reader to *The Mathematical Theory of Communication* for a more complete analysis), let us look at only two ideas—"coding" and "noise"—and see what seminal value they have for teachers and students of communication in general education.

The coding idea is easily approached in the classroom, and without undue perversion it seems to be an effective way of talking initially about the process which lies at the heart of all communication—symbolization—although that is not precisely the sense in which Shannon and Weaver use the term "code." The diagram here says, in effect, "Having settled

[3] Claude E. Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana, The University of Illinois Press, 1949), p. 5. (This diagram is reprinted by permission of the University of Illinois Press.)

[4] *Ibid.*, pp. 98-99, 107.

upon the desired message, the information source (say a human brain) must then put the message into a code which is capable of being transmitted and received and which can be understood by the other party." One can use the term "code" very broadly, to include spoken and written words, lines of a chart, musical tones, dance gestures, and the like. A code is generally arbitrary or conventional, so the person who receives the message must, in a sense, have the code book or he is unable to understand the message. This is a simple idea, of course, but it can lead to some interesting and unexpected discoveries, as did the following classroom demonstration which is used often in courses in Communication Skills at Teachers College.

The instructor invents an arbitrary code of perhaps twenty words, out of which a message like "You stand up and put your right hand in the air" can be constructed. Then the instructor prepares a second or "fake" code, using the same code words as on the first, but with different meanings. The two codes, which are roughly similar in general appearance, could be these:

Real Code	
CAVAB	stand up
CAVAC	don't move
CAVAJ	sit down
DAMAT	you
DAMAX	your friend
ELAMI	put
ELAMU	take
ELAMO	don't put
LATIR	right
LATIX	left
MAMIN	hand
MAMIT	elbow
MAMIX	head
TALIF	in the air
TALIP	on your shoulder
TALIQ	on the desk
TALIX	on the floor
UNIVO	and
UNIVA	but
UNIVI	therefore

Fake Code	
CAVAB	don't move
CAVAC	stand up
CAVAJ	sit down
DAMAT	your friend
DAMAX	you
ELAMI	take
ELAMU	put
ELAMO	don't put
LATIR	left
LATIX	right
MAMIN	elbow
MAMIT	hand
MAMIX	head
TALIF	on your shoulder
TALIP	on the desk
TALIQ	in the air
TALIX	on the floor
UNIVO	but
UNIVA	and
UNIVI	therefore

At an appropriate time in the class work, code sheets are distributed to students, with care taken to see that approximately every other student gets the "real" code, while others get the "fake" code. Nothing is said about the fact that two codes are being used. The teacher quickly writes on the blackboard the following words:

DAMAT CAVAB UNIVO ELAMI
LATIR MIMIN TALIF

and asks students to do what the instructions call for, which, with the "real" code is, "You stand up and put right hand in the air." The students who have the "fake" code can make out only this jumbled message: "Your friend don't move but take left elbow on the desk."

The whole demonstration could stop at this point, and in ensuing discussion the students could learn the important lesson that communication occurs only when codes of the originator and the receiver match—that they must use terms which their audiences understand and are prepared to accept. But an even more interesting matter was revealed by one teacher who, acting on impulse, decided

to badger the students mildly while they were trying to "decode" their messages, insisting that they complete the job, with, "Come on, work quickly now. This is a simple matter which shouldn't take you this long. Haven't my instructions been clear on this?" Gradually, under this insistence, a remarkably large percentage of the students rose and put their right hands in the air, yet half of them *did not understand why they were doing this!* The explanation, of course, as students and teacher quickly agreed in discussion, was that social pressure to *appear to understand* even if one doesn't is a very important factor in communication. This is a lesson which every teacher knows or soon learns—the assumption that one has "gotten through" or communicated because of another person's appearance is misleading at best. The most effective safeguard is to foster two-way communication in which, through give-and-take, one can assure a greater degree of mutual understanding. This is, of course, the feedback principle to which writers in information theory and cybernetics make reference.

These remarks do not exhaust the possibilities of exploring the coding idea, but we should sample as well the idea of "noise." At a technical level, as Weaver notes, noise is anything which distorts the signal. This problem is felt in everyday personal communication, when we compensate for unwanted sounds which blare through an open window to interrupt a meeting, or for unwanted light which flashes across a motion picture screen in the classroom. Metaphorically, one can expand the idea of noise to include what one student aptly called "psychological noise," an observation which is something like Weaver's suggestion for adding another box on the diagram to be called "Semantic Noise." "Psychological noise," to use the term which seems to be easily understood by students, might mean such things as the wandering mind, daydreaming, predisposition to resist the speaker's message, and the like. Every teacher knows immediately about both technical noise and psychological noise.

One important question to be raised in connection with this concept of "noise," for our purposes, is how to counteract noise or compensate for it in communication, assuming that it is always present. The film mentioned earlier, *A Communications Primer*,[5] offers four general principles for counteracting noise: first, make deliberate use of redundancy or repetition; second, strengthen the power of the signal; third, beam the signal more specifically to the target audience; fourth, reinforce the signal with other symbols, symbol systems, or mediums. These principles can serve as the basis for fruitful classroom discussion of practical ways of "getting the message through, loud and clear," as one student of nursing education expressed the import of the Shannon-Weaver material to her. The film also offers some interesting approaches to the coding idea, particularly in the field of art, or, as Susanne Langer would put it, in areas of non-discursive symbolism.

The Shannon-Weaver material is useful in inviting attention to aspects of communication other than "noise" and "coding." For example, a teacher could follow Weaver's suggestion and direct attention toward the problem of estimating capacity of audience and of channel. Or, one could draw explicit attention to the feedback idea. Most of us who teach general education classes, however, will need to

[5] *A Communications Primer*, produced by Charles and Ray Eames, with music composed by Elmer Bernstein. 1953. 16 mm, color, 22 minutes. Purchase price, $200, from Cine Service, 1350 Westwood Boulevard, Los Angeles 24, California.

stop short of considering all of the material which is embraced in the mathematical theory of communication. Such ideas as the statistical character of meaning, entropy, and the like are difficult to translate, although their value for general education courses in communication may be seen more quickly than one imagines at this writing.[6]

EMPHASIS ON PROCESS

Both of the models which have been discussed briefly here have qualities which lend themselves to adaptation for use in high school and undergraduate college courses in communication. First, both models may be stated relatively simply, so that students are not discouraged at the outset. A general understanding of what each model is about will come quickly to the student, yet the model will continue to serve him as far as he is capable of carrying his investigations in depth. Second, both call attention to a reasonable number of factors which are important considerations in the communication process, but not so many as to be unmanageable. Third, both models reveal to teachers and students many points at which research data may be applied. Fourth, to repeat a point which was made earlier, both permit one to consider by its use all modes of communication, verbal and non-verbal, in a range of contexts from face-to-face to mass communication.

[6] A teacher who wishes to explore these ideas further will be rewarded by reading selectively in Norbert Weiner's *Cybernetics: Or Control and Communication in the Animal and the Machine* (New York: John Wiley & Sons, 1948); Weiner's *The Human Use of Human Beings: Cybernetics and Society* (Boston: Houghton Mifflin Company, 1950); Jurgen Ruesch and Gregory Bateson, *Communication: The Social Matrix of Psychiatry* (New York: W. W. Norton & Company, 1951); H. A. Gleason, Jr., *An Introduction to Descriptive Linguistics* (New York: Henry Holt and Company, 1955).

More important than these qualities, however, is the manner in which these models (and others which have not been discussed here) emphasize the crucial point that communication is a process which is composed of many steps, and that continuous observation of that process is by far the best single method which any person has of increasing skill in communication.

For the experienced adult who has learned to communicate effectively, if not always easily, models such as these two may seem to labor the obvious. *Of course* you think about your audience before preparing a speech or before writing an article. *Of course* you use the right symbols or code. *Of course* you choose the medium which is most effective under the circumstances. *Of course* you pin point in advance the effect which you hope to achieve.

These are precisely the marks of sophistication in communication—the ability to consider a number of factors almost automatically. But the absence of that ability is precisely the mark of naïveté on the part of the struggling young student who focuses slavishly on a single aspect of communication, most generally on content or medium (*one* medium—language), both of which are important but neither of which offers a complete account of the communication process.

This single-factor approach to the study of communication generally stresses "correctness" at the expense of flexibility, and it may be that our failure to help students achieve flexibility and make distinctions in appropriate symbol choices for different situations—to develop a kind of symbolic awareness—lies behind the highly lucrative business of teaching "effective communication" to executives and sales forces in industry today, behind the spate of books on vocabulary, composi-

tion and speech-making of the "you too can . . ." variety, and also behind the uncertainty of parents over the newer, successful ways of teaching about language and composition and communication generally.

Achieving a broadened perspective for studying language and other means of communication as social processes in a variety of contexts will not be easy for teacher or student. For one thing, we must expect that many students may feel a momentary shock of insecurity when asked to look at something other than a rule. Of the Lasswell construct a student may say at first, "But what does the audience have to do with communication? Something is either right or it isn't right and that's all there is to it!" But with patient discussion of examples from his own experience, he will shortly come to see that appropriate communication behavior in one situation, with one audience, for one kind of purpose, is not necessarily appropriate in another setting with another audience for another purpose. The profound truth of this discovery will bring a sense of release which is often astonishing. The student will abandon his dogged and weary pursuit of rules which never go wrong in favor of developing a broader kind of guiding policy based on continued personal observation. In time he will learn to respect his own senses and may even come to say of one or another obsolete rule, "That generalization doesn't hold these days!"

Observation is the key, and yet we have only recently recognized it in our schools. We have preferred the prescriptive approach to language study. Our current recognition of the values of observing communication processes and drawing explicitly tentative generalizations from such observation has come in large measure from the contributions of modern descriptive linguists. And for those of us who prefer teaching communication broadly, using all contemporary mediums as subject matter (not merely as "aids"), a prescriptive approach is almost impossible. How can one reply sensibly to the question "Is it correct in a bulletin board to . . ."? The sentence cannot be finished because the presence of the word "correct" makes any sensible ending impossible. It is simply not congenial to think of the newer mediums in terms of absolutes. They can be observed, analyzed, studied, described, and from these operations can come insights into principles of effective symbol selection and combination. In the same sense, language can be studied and the learnings made to reinforce one another. This does not mean abandoning the many tried and proven approaches to language study which have served teachers so well. Rather it calls for re-examination of our field and a readiness to welcome the best which current research offers.

The models can help in this job, principally because they can suggest what to observe. They can't tell student or teacher how to do that observing, and they do not have answers inherent within them, but meaning is never inherent in the symbol. The timid teacher and the timid student will feel uncomfortable in the use of devices whose sole function is to provide structure for imagination, but that has always been the case. For the teacher and the student who are prepared to explore the field of communication in a comprehensive and searching way the models, and the ideas and investigations which lie behind them, give skeletal form to an exciting, cooperative venture.

Test Case*

LENNOX GREY

PROFESSOR OF ENGLISH, TEACHERS COLLEGE

A DEPARTMENT serving as a proving ground for any educational idea faces both inspiring and agonizing experiences. There are crucial responsibilities, risks, decisions. In a professional school you cannot casually commit students to programs for which there may be little professional outlet. Ordinarily you cannot carry on extensive projects of pure research, much as you might like to. You must have the courage to carry on research in action. If you speak vigorously for a new field of inquiry or instruction, you run the risk of having your department and your colleagues throughout the college stamped. Your critics ignore your balancing concern with other matters. Your valued academic and professional friends and colleagues do not always understand you, and some may fear that you are subverting the field or going off the deep end. If you succeed, you may contribute a little to the slow march of education, against the great inertias which Paul Mort has pointed out. If you fail, you penalize your department, your colleagues, perhaps your field and education generally.

But it is part of the role and responsibility of Teachers College to serve as a proving ground for the new while continually testing and conserving the best of the old.

PREPARATORY STUDIES IN COORDINATION

Our staff in the Teaching of English and Foreign Languages was not wholly unprepared for comprehensive work in communication and the communication arts. Neither were other departments. Many of us had very recently shared in the three-year (1938-1941) Columbia University Cooperative Program in the Pre-Service Education of Teachers, as part of the nation-wide program of the Commission on Teacher Education[1] of the American Council on Education. Our divisional seminar in the Humanities and Language Arts, with its staff in Speech, English, and Foreign Languages from Barnard College, Columbia College, and Teachers College, had been able to reach some key conclusions from its work with three successive seminars of sixteen or seventeen selected recent graduates from Barnard, Columbia, and other liberal arts colleges, in cooperation with other seminars in the Arts, Social Sciences, Natural Sciences and Mathematics, and Elementary Education, and with a Coordinating Seminar staffed by colleagues in Foundations of Education, Guidance, and Curriculum.

* Professor Grey was coordinator of the basic interdivisional course in communication 1943-48. He is head of the Department of the Teaching of English and Foreign Languages. He is past president of the National Council of Teachers of English.

[1] Karl W. Bigelow, on leave from Teachers College, directed the Commission's Study.

Our main finding in Humanities and Language Arts was that while we all enjoyed immensely the fairly typical Great Books–Humanities program with which our seminar elected to start, our very able students (some of whom had had undergraduate Humanities programs also) could not transfer any significant part of what they learned about human values in literature and art to their high school classrooms. It was not until, as a joint decision of students and staff, we made our approach by way of such modern communication arts as film, radio, recordings, pictorial graphics, and paper-back reprints (our "contemporary applied humanities") that our students could make effective contact with *their* students in the classroom, and begin to establish the perspectives on language, literature, and the symbolization of values in various arts which we sought.[2]

In the spring of 1941 we could not be quite sure where these and other discoveries would lead us. We hoped for time for still more careful research, perhaps over the next three years, reaching out to experience in other institutions. Some members of our cooperative program had felt that our three-year program had been too cautious or "traditional" in its broad field approach, and urged a "common-learnings" or problems-core approach. To discover if the time and they might be right, members of the earlier cooperative three-year program secured a grant from the General Education Board to bring together sympathetic teachers in various fields from representative liberal arts colleges, with staff members from Barnard, Columbia, and Teachers College, to explore the possibilities of these other approaches. The department, at the same time, was getting the first benefits in manuscript from three Ph.D. studies in the Humanities, which we had been carrying on with the cooperation of the Department of English and Comparative Literature in the Faculty of Philosophy—Patricia Beesley's "The Revival of the Humanities in American Education" (1940), Francis Shoemaker's "Aesthetic Experience and the Humanities" (1943), and Irving Ehrenpreis's "The 'Types Approach' to Literature" (1945)—confirming from various angles some of the difficulties which would have to be overcome if the values of the humanities were to be realized in American schools and colleges.

TEST BY FIRE

Pearl Harbor changed the picture, with life-or-death demands, apprehensions, accelerations. The effects on the teaching of English and Foreign Languages in the ensuing five years have been reported before,[3] and need only brief mention here: the recognition of crisis in the teaching of human values for democratic survival as well as physical survival when teachers of English and the arts turned their energies to scrap and stamp drives and pre-induction English; a quick cooperative field survey of the response of English, speech, art, and music teachers and administrators to the modern communication and communication arts emphasis suggested by our seminar findings; the report of this survey to the Board of Directors of the

[2] *Columbia University Cooperative Program for the Pre-Service Education of Teachers.* E. S. Evenden and R. Freeman Butts, editors (New York, Bureau of Publications, Teachers College, 1942).

[3] "New Perspectives in the Teaching of English and Foreign Languages," *Teachers College Record* (Vol. 47), January, 1946; "Current Dynamics in the Teaching of English and Foreign Languages," *Teachers College Record* (Vol. 49), December, 1947, with articles by Ida A. Jewett, Lennox Grey, Aileen T. Kitchin, Daniel P. Girard, Virginia French (Allen) and Philip Shuman, Louis Forsdale, and Mary Davis.

National Council of Teachers of English in November, 1942, and their unanimous resolution to emphasize the broad communication role in cooperation with teachers of other arts; the welcome given this resolution in Washington: the establishing of a Committee on Communication Arts by the U.S. Office of Education, the issuing of publications with this emphasis by the U.S. Office of Education, the Treasury Department, and Pre-Induction Training Branch of the War Department, and the consultant recommendations adopted by the Army and Navy for their college English programs. In all these the ideas found a rigorous testing ground. They had to work—to make sense as ideas and work out in practice. They did. But could they stand a longer pull without the stimulation of war, which had made Washington one great communication laboratory?

POSTWAR TRIALS

They seem to have done so, in a credit and debit tally. The wartime spurt has been followed by a range of field trials and investigations, and a constant searching of departmental and college experience.

Fourteen doctoral studies report on trials and investigations in various parts of the field, and others are in progress. Two are on communication programs in state teachers colleges, compared with communication programs elsewhere. One is on literature in a communication skills program in a New York State agricultural and technical institute (with three in progress on other aspects of communication programs in other state institutes or community colleges). One deals with the establishing of a program in a public junior college. One is in progress on the well-tested program of a state university. Two describe programs in communication and the related arts in liberal arts colleges for Negroes. One explores the effectiveness of instructional materials in various literary and arts media in New York City junior high schools. One studies communication arts in a private secondary school, with another in progress. One studies the history of problems of coordination of English and Speech. One works with resources for teaching the "art film" in college. One in progress analyzes concepts of the symbolic process for college teaching. Three record and examine critically the development of various aspects of the interdivisional and departmental program: Louis Forsdale's "The Interdivisional Program in Communication and the Communication Arts at Teachers College, Columbia University" (1951), William Hoth's "The Development of a Communication Skills Course, A History of the Undergraduate Program in Communication at Teachers College, Columbia University" (1954), and Joseph Pattison's "The Program in Laboratory Communication Experiences in the Department of the Teaching of English and Foreign Languages, Teachers College, Columbia University" (1955). Committees for these studies have brought together members of the interdivisional committee from more than one department.

All of these studies pivot on the key concepts of modern communication inquiry: that communication is a two-way symbolic process; that human community depends on communication through symbols in the family, the neighborhood, the region, and throughout the world; that the variable interpretation of such symbols is the basis of much of our misunderstanding; that symbols of various kinds reinforce one another in the communication of information, ideas, feelings, values; that skill in the arts of communication is

essential for individual development—for social competence, for intellectual growth, for personal resourcefulness; that new mediums and arts of mass communication may provide more of our common experience than print provides; that new instruments and arts of communication now for the first time make possible world community, as well as much larger and more tightly integrated local community units.[4]

Members of the department have had opportunity to work with these ideas in a range of projects or consultant activities: with the Metropolitan School Study Council, the Citizenship Education Project, the Columbia University educational television program "Horizons," the Army and Navy college programs, the U.S. Armed Forces Institute, the U.S. Office of Education, a field study of communication in junior colleges with the aid of the General Education Board, the New York State technical institute program as curriculum and research consultants, the English curriculum project of the New York City Board of Education, the curriculum development programs of Bethlehem, Pennsylvania, and New City, New York, the directing of summer communication arts conferences at Teachers College and the University of Wisconsin and others.

Members of our departmental staff have been able to maintain broad perspectives and see critical problems through various offices they have held: as vice president and president of the National Council of Teachers of English, as assistant and associate chairman of the NCTE Conference on College Composition and Communication, as associate chairman of the NCTE Committee on Television, Radio and Film, as coordinator of the NCTE committees dealing with communication, as delegates to meetings of the American Council on Education concerned with problems of mass media of communication and education, as executive committee member of the Association for Education by Radio and Television, and certainly not least important, as coordinators of the Teachers College interdivisional course.

There have been debits, inevitably—failures, inadequacies, misunderstandings, gratuitous attacks. In the last two years of the war it was possible to bring out only six of the twelve pamphlets on communication which the NCTE had ambitiously projected—three published by the NCTE, and three by government agencies. In a revulsion against wartime concerns the remainder of the series was canceled, and at the first NCTE meeting after the war the word "communication" became all but taboo. But it came back vigorously a year later, and the new NCTE Curriculum Commission gave it a major place as its deliberations went on. The national wartime cooperation of teachers of speech and English in conferences on communication, encouraged by Magdalene Kramer and others, gave way to separate groups under other leadership: the NCTE Conference on College Composition and Communication and the NATS National Society for the Study of Communication. But both retained interest in communication. With wartime dislocations it was not possible to consult with all our colleagues and friends in Columbia about our advocacy of communication and the communication arts—to make clear that we sought to support the humanities, not to desert or degrade them—and so to avoid unhappy slaps at this

[4] See Lennox Grey and Francis Shoemaker, "General Education in Relation to Vocational-Technical Education in the New York State Institutes of Applied Arts and Sciences" (Albany, State Education Department, 1946). (Mimeographed)

"catch-all fad." But happily these were not many. The most conspicuous and painful attack—Albert Lynd's "Quackery in the Public Schools" in *The Atlantic Monthly*, selecting our departmental emphasis on communication as a particular target—seemed at the moment very hard to correct because of the high regard in which English teachers had held *The Atlantic*. But the flood of reassuring letters to us, and other protesting letters to *The Atlantic* from our respected academic and professional friends, more than compensated for the misrepresentations of an advertising man who proved the dangers of inability or unwillingness to read.

Altogether, what we have learned credit-wise and otherwise in these dozen years seems to have justified our steady (though by no means single or exclusive)† departmental concern with communication. We believe we have proved the durability and economy of certain key concepts, have opened enlarged opportunities for students, have provided greater reach and flexibility than the older culture-and-correctness school of English (though cultural insight and good usage still seem to us good), and have gained stimulating and practical contacts with many key ideas and workers in various fields.

As varied illustration,

—Time and events have supported our very early judgment that a focus on symbolic processes and the "ecological" interplay of forces in communication was educationally sound—two matters to be looked at in the next section, "Focusing on Critical Indices."

—In professional opportunities for students "trained in communication," we have continually had more requests for teachers than we could fill.

—In reach and flexibility, the twenty and more communication instructors we have supplied to the New York State institutes, for instance, have had the resources and adaptability to meet varied demands, and to foresee the new demands as some of the institutes have become community colleges or as new community colleges have been established—and incidentally have provided a significant group for realistic comparing of notes.

—Many others in high schools, junior colleges, teachers colleges, state colleges, universities, and communication agencies have testified to the liberating values, for themselves and their students, of the concepts and resources they have found in their studies in communication—far more than have been confused, or unable or unwilling to face its many-sided problems.

—Louis Forsdale, as coordinator of the interdivisional course, has made some searching, useful, and generally gratifying studies of student response subsequent to his doctoral study.

—The sustained interest and faithfulness of the busy members of the Interdivisional Committee in giving recurrent lectures, in attending meetings and staff seminars, and in serving on doctoral committees, indicate a continuing interest in interfield exchanges on communication that goes beyond the call of duty, and that calls for a special note of appreciation.

For many reasons, the Department of the Teaching of English and Foreign Languages has met the largest practical demand in the first stages. Teachers College does not have a department of library science, or journalism, or an office of communication research or applied social research, which have been other im-

† Since 1945 we have carried forward other major studies in linguistics and English as a second language, and since 1946 have made increasing application of language-culture-area studies to both foreign languages and English. Recently we have been taking soundings in the interplay of the language arts with other aspects of core curricula, and studies of regional literature and literary audience in various media as an approach to the study of literature, communication arts, and humanities.

portant practical points of convergence elsewhere. With the economy of focus and the courtesy which distinguish Teachers College where field demands lie particularly in one area, the tryout responsibilities were left largely to the English staff, in association with members of other departments concerned with speech, reading, visual arts, music, curriculum, and foundations of education. From the start, for reasons that have been partly indicated, a good deal of attention was focused on Communication Arts as contemporary applied humanities, though always in the larger context, looking toward a balance with studies in communication as contemporary applied social sciences and as contemporary applied mathematics and science, not separated sharply on a basis of differences, as broad field courses in the Humanities, Social Sciences, and Natural Sciences tend to be, but coming together naturally on a common professional concern that is one of the most compelling interests of people generally. Teachers College had particularly strong and flexible resources for educational studies in the Communication Arts, not being comprehensively explored elsewhere. Other universities had significant programs in communication with social and scientific emphasis, on which we could draw without diverting our energies into too many fields at the start. Under the chairmanships of Lyman Bryson in Social Foundations and Arthur Young in Fine and Industrial Arts, the coordinatorship of the interdivisional course by Louis Forsdale, and the prospective coordination of research with the guidance of Irving Lorge in Psychological Foundations, we have sought to maintain a comprehensive rather than departmental view, constantly aware of departmental or applied humanities limitations, yet encouraged by the spoken and unspoken confidence of colleagues in other fields that we might make a useful test contribution, worthy of Teachers College, Columbia University, and Education generally.

FOCUSING ON CRITICAL INDICES

We do not require the elaborate analysis of George Kingsley Zipf's *Human Behavior and the Principle of Least Effort* (1949) to make us recognize the need of economy of time, energy, and other resources in education. (Nor should we be deflected by Zipf's debatable points.) We know that we cannot investigate and teach everything. We must choose—find the most crucial nexus or index points, thus getting focus but always keeping in mind and reminding others that they *are* nexus points, where many forces and factors converge or intersect. Thus, we get the economy of a readability formula with five considerations, say, drawn from the many that might have been chosen, or the more complicated interplay of considerations set up by E. L. Thorndike in *Your City* (1939) to give a comparative measure of how *good* a city is. Every thoughtful teacher and educational research worker selects what he thinks will give the most useful keys, many things considered (never *all* things considered).

What clues can one department take from these articles and its experience to help it find the five, or fifteen, or fifty index or nexus points?

These articles and most other modern studies keep recurring to the phenomenon of symbols and man's symbol-making nature. There are risks in the analogies which see in the symbol something comparable to the cell in biology, the atom in chemistry, or the electrons, protons and neutrons in physics—the basic units. Ultimately, in studies of symbols the basic

unit will probably not be the overt symbol—the letter symbolizing a sound—or a pictogram, a thing or a circumstance or an act or a quality—or the word symbolizing all these and many other things —or mathematical symbols, the quantitative relations of things or concepts, even unto infinity—or the artist's lines and colors or the musician's sounds and rhythms, expressing and relating our myriad perceptions of space and time, also unto infinity —or the anthropologist's symbols of culture, making as finite as possible the otherwise elusive flow of cultural consciousness. Ultimately, perhaps it will be in those synaptic knobs, pointed out by Hebb and others, which form or do not form, or which, once formed, become disused and disappear, in the nerve cells of the brain, perhaps facilitating or limiting the quickness and range of our perceptive responses, compelling us or enabling us to symbolize the whole with the part. But at the moment, pending much more research in physiological psychology, there is fairly general agreement on the overt symbol as our "atom"—with enough awareness that our atom may be split to keep us from dogmatizing about it. There is our basic working unit. And students at all levels from junior high school through graduate school find that they can work with it at various stages of perceptiveness, thanks to increasing symbolic awareness through experience with film, radio, television and pictorial graphics as well as print. Their problem and ours is to get the infinitude of symbols into some significant relations, with comprehensive flexible form and order.

Is there any way now of seeing our many symbols, and our various approaches to symbols, in comprehensive relationships—of mapping them perhaps?

The General Semanticists warn that "the map is not the territory"—a useful caution if it does not negatively block our thinking about the extent to which maps (never singular) taken together may give a comprehensive picture of a territory—its contours and terrain, its seas and lakes and rivers, its geological history, its plants and animals, its highways and cities and parks. Modern pictographic travel maps combine these in interesting ways—from ice caves and picture rocks, to skyscrapers and suspension bridges. "Naive" and "commercial" as they often may be, such maps may provide significant clues to the way people can organize diverse symbols. Better still, if we want to bring the map as close as possible to the territory, is to make it actually as well as symbolically four-dimensional (in space *and time*). We have an example in the Warburg Room of the American Museum of Natural History. This room exemplifies, in the cross-section microcosm of a New York State area, at various seasons and various stages of its history, the concepts of modern ecology—an interdisciplinary science which began in botany with the study of the interactions of plants with one another, with other living things, and with their environment, and which in expanded and expanding form has provided very important concepts for studies in the social sciences and other fields.

The staff in the Teaching of English has tried various organizing concepts and contexts for dealing with the complexities of communication, to bring them into manageable range, with clearly seeable nexus or index points. No other has been so durable or serviceable as this modern ecological view. We began with anthropological concepts, but presently found it helpful to put them into the larger modern ecological context, as anthropologists themselves have been tending to do (for example, Warner in the "Yankee City"

series and in *Democracy in Jonesville*) for effective insight into modern American culture. Many students, like some anthropologists, tended to think of anthropology as something confined to study of primitive cultures, instead of reaching out with the imagination of Margaret Mead or Lloyd Warner. It has seemed better to reach out through anthropology to a less familiar and more comprehensive concept, and one at the same time that could be made visible.

We have had durable useful starting symbols in the "ecological turtle" and Highway 66 (symbols should not be taken separately but in relation to one another) in Steinbeck's *The Grapes of Wrath*. To the migratory turtle, Highway 66 is an almost insuperable obstacle —its embankment, its traffic which finally spins him off the road, lucky to be alive and to drop on the other side the seeds which he had picked up earlier when an ant had run into his shell and caused him to draw in. To the migratory Joads, Highway 66 has a different meaning, though it has its human and mechanical and natural perils too. Here is the essential ecological outlook of *The Grapes of Wrath*, implied rather than spoken explicitly, behind the timely incidents of the Oakies which gave Steinbeck his immediate economical approach to his readers. Steinbeck takes Tom Joad's understanding only as far as a mystical sense of "one big soul"—as far as Emerson got in his Neo-Platonic idea of an Over-Soul to be seen in the interrelations of nature in pre-ecology days. But Steinbeck made his concept very explicit two years after *The Grapes of Wrath* in *Sea of Cortez* (1941), written in collaboration with Edward F. Ricketts, a marine biologist who could check Steinbeck if he went far astray from the disciplines of the marine biology which Steinbeck had studied at Stanford (the most important single nexus point, probably, but often overlooked, in relating the author's biography and his work). In it he not only makes his ecological outlook explicit, but shows how it shapes his concept of literary form:

> We have a book to write about the Gulf of California. We could do one of several things about its design. But we have decided to let it form itself: its boundaries a boat and a sea; its duration a six weeks' charter time; its subject everything we could see and think and even imagine. . . .
>
> . . . We wanted to see everything our eyes could accommodate, to think what we could, and, out of our seeing and thinking, to build some kind of structure in modeled imitation of the observed reality. We knew that what we would see and record and construct would be warped, as all knowledge patterns are warped, first, by the collective pressure and stream of our time and race, second by the thrust of our individual personalities. But knowing this, we might not fall into too many holes—we might maintain some balance between our warp and the separate thing, the external reality.[8]
>
> "Let us go," we said, "into the Sea of Cortez, realizing that we become forever a part of it; that our rubber boots slogging through a flat of eel-grass, that the rocks we turn over in a tide pool, make us truly and permanently a factor in the ecology of the region. We shall take something away from it, but we shall leave something too." And if we seem a small factor in a huge pattern, nevertheless it is of relative importance. We take a tiny colony of soft corals from a rock in a little water world. And that isn't terribly important to the tide pool. Fifty miles away the Japanese shrimp boats are dredging with overlapping scoops, bringing up tons of shrimps, rapidly destroying the species so that it may never come back, and with the species destroying the ecological balance of the whole region. That isn't very important in the world. And six thousand miles away the great bombs are falling on London and the stars are not moved

[8] John Steinbeck and Edward F. Ricketts, *Sea of Cortez* (New York, The Viking Press, 1941), pp. 1-2.

thereby. None of it is important or all of it is.[6]

Our own interest lay in relationships of animal to animal. . . . One [species] emerges into another, groups melt into ecological groups until the time when what we know as life meets and enters what we think of as non-life: barnacle and rock, rock and earth, earth and tree, tree and rain and air. And the units nestle into the whole and are inseparable from it. Then one can come back to the microscope and the tide pool and the aquarium. But the little animals are found to be changed, no longer set apart and alone. And it is a strange thing that most of the . . . mystical outcrying which is one of the most prized and used and desired reactions of our species, is really the understanding and the attempt to say that man is related to the whole thing, related inextricably to all reality, known and unknowable. . . .[7]

From this we urge students to turn to *This Is Our World*, by Paul B. Sears, formerly at the University of Oklahoma and Oberlin College, now at Yale, one of our distinguished American ecologists, who was brought to Teachers College in 1938-39 as a research fellow to assist in our Studies in Science in General Education, under the leadership of Professor S. Ralph Powers. Sears says with a vision and symbolic eloquence anticipating Steinbeck's:

Man is, after all, a part of mankind, and mankind a part of nature. Man is within, and not above, the vast symphony of environment and of all life. . . .

The demonstration of this fact, and of man's origin in a long and earthy past, has been rocking the world for about eighty years—since the Darwinian earthquake. . . .

But any earthquake which clears away the hovels for a better city is likely to shatter some goodly buildings as well. For upwards of a thousand years the western world had been paving the way for modern science by a firm structure of belief in the reign of law. Its universe was an ordered universe, and the duties of man were laid down, clear, unequivocal.

[6] *Ibid.*, pp. 3-4.
[7] *Ibid.*, pp. 216-17.

The intimation that man is an animal became the signal to break ranks. If the red rule of nature was ruthless, so be it . . . morals became at best a matter of convenience. . . .

It is possible for a poison draught to contain its own antidote. For not quite fifty years, science, driving on to the bitter end with its assumptions, has been investigating the behavior of living things under natural conditions as well as in the laboratory. And if it has found little that will comfort the sentimentalists, it has uncovered much that will gladden the understanding heart.

It has found, to be brief, that Nature is indeed ruthless, but in her ruthlessness she plays no favorites. Justice is to be had, but it is neither for those who swagger, nor those who beg. It must be built, on Nature's terms, through understanding and painful toil. There is no event that is not numbered, that does not have its consequences. Conduct has become once more a matter of tremendous significance, continuity and destiny once more the rule of life.

This is not to say that any individual is free, in the old theological sense, and that the transaction is between him and Nature uncushioned. She works upon him, and he responds, through the medium of his culture. In this he lives, and moves, and has his being. It limits and compels him, true, at every step; yet it can be altered by his participation, his understanding, his will, and his work.[8]

From such broad perspectives and key symbols, which indicate why, at the dedication of the Warburg Room, Louis Bromfield could speak of ecology as both a science and a philosophy, we can reach out to many kinds of evidence and suggestions and contributions to technique: to W. Lloyd Warner's work in the "Yankee City" series (prompting Marquand's *Point of No Return*, beginning in hostility and ending in acceptance, seemingly) and *Democracy in Jonesville;* to Dewey and Bentley's concern with "transaction" in *Knowing and the Known* (1949), in

[8] Paul B. Sears, *This Is Our World* (Norman, University of Oklahoma Press, 1937), pp. 5-8.

which the educational philosopher and the student of the Humanities find ecology to be one of the most promising disciplines; and to many others.

Students of English discover, incidentally, that there is a considerable unrecognized school of "ecological novelists"—John Steinbeck, George R. Stewart, Conrad Richter, Louis Bromfield, Donald Culross Peattie, J.P. Marquand (reluctantly?), and others—who are taking us out of the narrow naturalistic determinism which has dominated our serious literature for a half century. And that is a matter of importance to more than English teachers. (We *must* write that article on them!)

So we come to our decisive question: *Can we, from the nexus points suggested by the articles in this issue and from practical experience of one department reaching out to many fields, develop a comprehensive yet economically focused interdivisional "ecology of communication" which will be intelligible to our students and* their *students, supported at every* key *point by significant educational research?*

Next Steps

THE preceding nine articles not only exemplify the essential wholeness of communication but also demonstrate the many different ways in which communication can be studied. The significant generalization, however, is that each article, in the very act of describing an aspect or a portion of communication, substantiates its totality. The interactions between culture and the individual personality are like complementary matrices that constantly form and re-form the symbols and the means by which men communicate with one another, appreciate one another's productions, and transmit the stored knowledges to future generations.

Communication is effected by language, whether oral or written. Albeit languages are important—maybe even the most important vehicle for affecting men's minds and emotions—these articles give evidence that the visual, auditory, and plastic arts are also of tremendous significance. The arts are not only ways for the artist to express himself but also the means by which uncounted audiences get new views, new understandings, and new appreciations. The relation between the unusual new creation and its understanding by ever-increasing numbers raises exciting prospects for the future. How does the artist—painter, sculptor, musician—make his new communications? And how was the percipient audience made available? The psychologist may talk about empathy, the humanists may call upon sensitivity, and the educator may specify awareness to account for these new communications between the creative artist and the audience. But each must concede that these specialized words neither describe nor explain the subtleties of the transactions between artist and audience, speaker and hearer, or writer and reader. The next step in an interdisciplinary approach to communication is to account both for the development of the communicators and for their receptive audiences. It is always exciting to think of ways in which the school can help children understand the multidimensionality of the communications to which they are exposed and, more important, of those to which they are exposed long after their formal schooling has been finished. The future brings with it a range of problems, pure and applied, to make possible understanding of the growth and development of communication in the child and of social interactions throughout the life span.

Staff, INTERDIVISIONAL SEMINAR

A Selected Bibliography in Communication and Communication Arts

This selected bibliography, as noted in the Progress Report, has developed over a period of years, along with the interdivisional course, Communication and the Communication Arts in the Modern Community. It is not intended as replacement of or supplement to the various comprehensive bibliographies already in existence, or as definitive in any single area of research. It represents a selection of readings that pre-service and experienced teachers find valuable in their initial explorations in Communication. It is included here with the thought that it will provide some guides to beginning inquirers in the field.

CONTRIBUTIONS TO THE STUDY OF COMMUNICATION 141

ANTHROPOLOGICAL, ECOLOGICAL, AND SOCIOLOGICAL 141
HISTORICAL 141
MATHEMATICAL 141
PHILOSOPHICAL 141
PSYCHOLOGICAL 142
LEGAL, POLITICAL SCIENCE 143
EDITED COLLECTIONS 143

STUDIES IN ARTS AND THE NEWER MEDIUMS 143

ARTS
Dance 143
Language 143
Literature and the Literary Audience 144
Music 145
Theatre and Drama 146
Visual and Plastic Arts 146
Architecture 146

NEWER MEDIUMS
Film 147
Press 147
Radio and Television 148

STUDIES IN PROPAGANDA, PUBLIC RELATIONS, PUBLIC INFORMATION, AND AUDIENCE 148

EDUCATIONAL EXTENSIONS 149

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